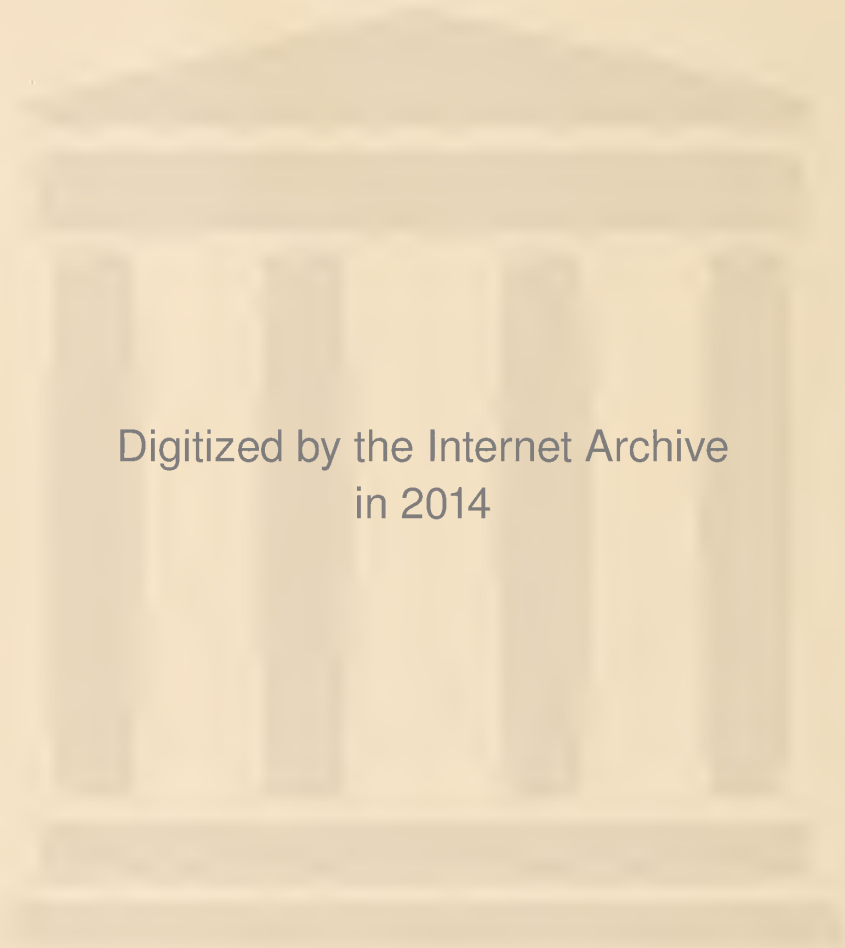

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NOEL H. HOLMGREN

AN

ILLUSTRATED FLORA

OF THE

NORTHERN UNITED STATES, CANADA

AND THE

BRITISH POSSESSIONS

FROM NEWFOUNDLAND TO THE PARALLEL OF THE SOUTHERN BOUNDARY OF VIRGINIA, AND FROM THE ATLANTIC OCEAN WESTWARD TO THE 102D MERIDIAN

BY

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THE DESCRIPTIVE TEXT

CHIEFLY PREPARED BY PROFESSOR BRITTON, WITH THE ASSISTANCE OF SPECIALISTS IN SEVERAL GROUPS; THE FIGURES ALSO DRAWN UNDER HIS SUPERVISION

IN THREE VOLUMES

VOL. I

OPHIOGLOSSACEAE TO AIZOACEAE

FERNS TO CARPET-WEED

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Introduction.

THE present work is the first complete Illustrated Flora published in this country. Its aim is to illustrate and describe every species, from the Ferns upward, recognized as distinct by botanists and growing wild within the area adopted, and to complete the work within such moderate limits of size and cost as shall make it accessible to the public generally, so that it may serve as an independent handbook of our Northern Flora and as a work of general reference, or as an adjunct and supplement to the manuals of systematic botany in current use.

To all botanical students, a complete illustrated manual is of the greatest service; always useful, often indispensable. The doubts and difficulties that are apt to attend the best written descriptions will often be instantly solved by figures addressed to the eye. The greatest stimulus, moreover, to observation and study, is a clear and intelligible guide; and among the aids to botanical enquiry, a complete illustrated handbook is one of the chief. Thousands of the lovers of plants, on the other hand, who are not botanists and are not familiar with botanical terms or the methods of botanical analysis, will find in the illustrations of a complete work the readiest means of comparison and identification of the plants that grow around them; and through the accompanying descriptions they will at the same time acquire a familiarity with botanical language. By these facilities, not only will the study of our native plants be stimulated and widened among all classes, but the enjoyment, the knowledge and the scientific progress derivable from these studies will be proportionately increased.

Though most European countries have complete illustrations of the flora of their own territory, no similar work has hitherto been attempted here. Our illustrated works, some of them of great value, have been either sumptuous and costly monographs, accessible to comparatively few, or confined to special groups of plants, or have been works of a minor and miscellaneous character, embracing at most but a few hundred selected species, and from incompleteness, therefore, unsuited for general reference. Scarcely one-quarter of the species illustrated in the present work have ever been figured before. That no such general work has been previously attempted is to be ascribed partly, perhaps, to the imperfect exploration of our territory, and the insufficiency of the collections to enable such a work to be made approximately complete; partly to the great number of species required to be figured and the consequent difficulty and cost of the undertaking, and partly to the lack of any apparent demand for such a work sufficient to warrant the expense of the enterprise.

The increased accumulations of material in our largest herbaria, the result of multiplied explorations, and the widely extended interest in the study of our native plants, seem now to justify the endeavor to supply a complete illustrated work adapted to general use.

The enterprise, projected by Judge Brown, and maintained and supervised by him throughout, has been diligently prosecuted for the past six years. Its execution has been mainly the work of Dr. Britton. The text, founded upon a careful examination of living or herbarium specimens, has been chiefly prepared by him, with the assistance, however, of specialists in a few groups who have contributed the descriptions for certain families as stated in the footnotes. The figures also have been drawn by artists under his immediate supervision; except those of most of the grasses, drawn by Mr. Holm, under the eye of Prof. Scribner; while the work in all its parts has been carefully revised by both authors. The keys to the genera and species, based upon a few distinctive characters, will, it is believed, greatly facilitate the determinations.

In preparing a new work of this character, the authors have felt that there should be no hesitation in adopting the matured results of the botanical studies of the last half century here and in Europe, so as to bring the work fully abreast of the knowledge and scientific conceptions of the time, and make it answer present needs. Although this involves changes in systematic order, in nomenclature, and in the division of families and genera, such as may

seem to some to be too radical, no doubt is entertained that time will fully justify these changes in the judgment of all, and demonstrate that the permanent advantages to Botanical Science will far outweigh any temporary inconveniences, as has been already so fully shown in Ornithology and other zoölogical sciences.

The work will be completed in three volumes and will be issued as rapidly as it can be printed, the text being already written and the figures drawn.

Area.

The area of the work extends from the Atlantic Ocean westward to the 102d Meridian, a little beyond that of Gray's Manual, so as to include the whole of the State of Kansas; and northward from the parallel of the southern boundary of Virginia and Kentucky to the northern limits of Labrador and Manitoba. For convenience, the whole of Nebraska has been included, thus permitting the illustration of practically the entire Flora of the northern portion of the Great Plains.

The Flora of Canada and the British possessions not being distinguishable by any well marked features from that of the adjacent parts of the United States, and not embracing more than about 300 additional species, it was deemed best to include this more northern territory, in order to present a manual of the whole Flora of the northeastern part of the continent, with the exception of that of Greenland and the Arctic Circle, which is much the same on both continents; nearly all the Arctic plants are, however, included, as but very few of them are strictly confined to the Arctic Zone.

Figures.

Within the above area there are over 4,000 recognized species, more than three times the number in Bentham's Illustrated Handbook of the British Flora. To illustrate all these in a work of moderate size and cost, only parts of each plant could usually be figured, and these mostly below life-size. To exhibit full-page illustrations would have added fourfold to the bulk of the work, and the consequent more limited sales would have necessarily increased the price in a much greater proportion, and thus have thwarted the primary object, viz., to supply a work adapted to general circulation and use. On the other hand, it was found that any considerable further reduction of the figures in order to reduce the size of the work, would be at the sacrifice of the clearness and usefulness of the illustrations.

In the general plan adopted and in giving parts only of the larger plants, it has been the constant aim to make the reduction of each figure as little below life-size as possible, to select the most characteristic parts for illustration and to preserve the natural proportions. In these respects, it is believed, the present work will be found to be at least not inferior to that above named and often superior.

The cuts are all from original drawings for this work, either from life or from herbarium specimens, though reference has constantly been made to published plates and figures. All have been first drawn life-size from medium-sized specimens, and afterwards reduced to the proportion indicated by the fraction near the bottom of each cut, most of them being from ½ to ⅔ of medium life-size. By this method the illustrations do not suffer from the use of a magnifier, but are improved by it and regain their full expression.

Enlargements of special parts are added in most of the illustrations in order to show more clearly the floral structure, or minute organs, or the smaller flowers. These are in various degrees of enlargement, not deemed necessary to be stated. The figures are uncolored, because coloring, except in costly work, obscures the fineness of linear definition and injures the cuts for descriptive and educational uses.

The Classification of Plants.

The Plant Kingdom is composed of four Subkingdoms, or primary groups:

1. Thallophyta, the Algae, Fungi and Lichens.
2. Bryophyta, the Mosses and Moss-allies.
3. Pteridophyta, the Ferns and Fern-allies.
4. Spermatophyta, the Seed-bearing plants.

The subkingdoms are divided into Classes, the Classes into Orders, the Orders into Families, the Families into Genera, and the Genera into Species, a species being composed of all the individuals of a kind capable of continuous successive propagation among themselves, and being the only group marked out by nature by such a definite and positive boundary.

In addition to these main ranks, subordinate ones are sometimes employed, when further division is desirable: thus a Class may be separated into Subclasses, as the Class Angiospermae into the Subclasses Monocotyledones and Dicotyledones; Families may be separated into Tribes, as in the treatment of Gramineae in the following pages; Genera are often separated into Subgenera; and in the case of Species, where certain individuals are found to exhibit features of structure or aspect differing more or less constantly from the majority of the kind, these are set off as Varieties or Subspecies. Often the varieties or subspecies are subsequently found to be distinct species.

The variability of some species, caused by the operation of the forces collectively known as the factors of organic evolution, is so great, and the variation being often toward a related species, that it is sometimes very difficult to determine whether certain individuals belong to one or to the other, or to a variety of one or the other. This leads to different opinions. The actual fact, whether of the same species or not, may usually be ascertained by the close examination of a large number of specimens, or by growing the forms in question side by side, when, if they are the same, their rapid approximation will be manifest; though if their natural habitats are in different soils, this latter experiment may not be a satisfactory test.

The grouping of Species into Genera, and of Genera into Families, though based upon natural characters and relationships, is not governed by any definite rule that can be drawn from nature for determining just what characters shall be sufficient to constitute a Genus or a Family. These divisions are, therefore, necessarily more or less arbitrary and depend upon the judgment of scientific experts, in which natural characters and affinities, as the most important and fundamental factors, do not necessarily exclude considerations of scientific convenience. The practice among the most approved authors has accordingly been various. Some have made the number of genera and families as few as possible. This results in associating under one name species or genera that present marked differences among themselves. The present tendency of expert opinion is to separate more freely into convenient natural groups, as genera and families, according to similarity of structure, habit, form or appearance. While this somewhat increases the number of these divisions, it has the distinct advantage of decreasing the size of the groups, and thus materially facilitates their study. This view has been taken in this work, following in most instances, but not in all, the arrangement adopted by Engler and Prantl in their recent great work, "Natürliche Planzenfamilien," * not yet quite completed, in which all known genera are described.

Systematic Arrangement.

The Nineteenth Century closes with the almost unanimous scientific judgment that the order of nature is an order of evolution and development from the more simple to the more complex. In no department of Natural Science is this progressive development more marked or more demonstrable than in the vegetable life of the globe. Systematic Arrangement should logically follow the natural order; and by this method also, as now generally recognized, the best results of study and arrangement are obtained. The sequence of Families adopted 50 or 75 years ago has become incongruous with our present knowledge; and it has for some time past been gradually superseded by truer scientific arrangements in the later works of European authors.†

The more simple forms are, in general, distinguished from the more complex, (1) by fewer organs or parts; (2) by the less perfect adaptation of the organs to the purposes they subserve; (3) by the relative degree of development of the more important organs; (4) by the lesser degree of differentiation of the plant-body or of its organs; (5) by considerations of antiquity, as indicated by the geological record; (6) by a consideration of the phenomena of embryogeny. Thus, the Pteridophyta, which do not produce seeds and which appeared on the earth in Silurian time, are simpler than the Spermatophyta; the Gymnospermae in which the ovules are borne on the face of a scale, and which are known from the Devonian period onward, are simpler than the Angiospermae, whose ovules are borne in a closed cavity, and which are unknown before the Jurassic.

In the Angiospermae the simpler types are those whose floral structure is nearest the

* Berlin, 15 volumes, 1890–1896.

† Engler und Prantl, "Natürliche Pflanzenfamilien;" Warming, "Systematic Botany, 1895;" Vines, "Student's Handbook of Botany, 1895;" Richter, "Plantae Europeae, 1890;" Thomé, "Flora von Deutschland, OEsterreich und der Schweiz, 1886–1889;" Potonié, "Illustrirte Flora von Nord- und Mittel-Deutschland, 1887;" Schlechtendahl, Langethal und Schenck, "Flora von Deutschland," fifth edition by Hallier, 1880–1885.

structure of the branch or stem from which the flower has been metamorphosed, that is to say, in which the parts of the flower (modified leaves) are more nearly separate or distinct from each other, the leaves of any stem or branch being normally separated, while those are the most complex whose floral parts are most united. These principles are applied to the arrangement of the Subclasses Monocotyledones and Dicotyledones independently, the Monocotyledones being the simpler, as shown by the less degree of differentiation of their tissues, though their floral structure is not so very different nor their antiquity much greater, so far as present information goes. For these reasons it is considered that Typhaceae, Sparganiaceae and Naiadaceae are the simplest of the Monocotyledones, and Orchidaceae the most complex; Saururaceae the simplest family of Dicotyledones, and Compositae the most complex.

Inasmuch as evolution has not always been progressive, but some groups, on the contrary, have clearly been developed by degradation from more highly organized ones, and other groups have been produced by divergence along more than one line from the parent stock, no linear consecutive sequence can, at all points, truly represent the actual lines of descent.

The sequence of families adopted by Engler and Prantl, in "Natürliche Pflanzenfamilien" above referred to, has been closely followed in this book, in the belief that their system is the most complete and philosophical yet presented. The sequence of genera adopted by them has for the most part also been accepted, though this sequence within the family does not attempt to indicate greater or less complexity of organization.

It was originally intended to present a conspectus of the orders and families included in this work in the Introduction, as is indicated upon page 62 of this volume. But as the printing proceeded it was deemed better to place this at the end of the third volume.

Nomenclature.

The names of genera and species used in this work are in accordance with the Code of Nomenclature devised by the Paris Botanical Congress in 1867, as modified by the rules adopted by the Botanical Club of the American Association for the Advancement of Science at the meetings held at Rochester, New York, in August, 1892, and at Madison, Wisconsin, in August, 1893. These names were mostly elaborated in the "List of Pteridophyta and Spermatophyta growing without Cultivation in Northeastern North America," prepared by the Committee of that association and published in 1894 as the fifth volume of Memoirs of the Torrey Botanical Club. The synonyms given under each species in this work include the recent current names, and thus avoid any difficulty in identification.

The necessity for these rules of nomenclature arose from the great confusion that has existed through the many different botanical names for the same species or genera. Some species have had from 10 to 20 different names, and, worse still, different plants have often had the same name. For about 200,000 known species of plants there are not fewer than 700,000 recorded names. Such a chaotic condition of nomenclature is not only extremely unscientific, burdensome and confusing in itself, but the difficulty and uncertainty of identification which it causes in the comparative study of plants must make it, so long as it continues, a serious and constant obstruction in the path of botanical inquiry.

The need of reform, and of finding some simple and fixed system of stable nomenclature, has long been recognized. This was clearly stated in 1813 by A. P. De Candolle in his Théorie Élémentaire de la Botanique (pp. 228–250), where he declares priority to be the fundamental law of nomenclature. Most systematists have acknowledged the validity of this rule. Dr. Asa Gray, in his Structural Botany, says (p. 348): "For each plant or group there can be only one valid name, and that always the most ancient, if it is tenable; consequently no new name should be given to an old plant or group, except for necessity."

This principle was applied to Zoölogy in the "Stricklandian Code," adopted in 1842 as Rules of the British Association, and revised in 1860 and 1865 by a committee embracing the most eminent English authorities, such as Darwin, Henslow, Wallace, Clayton, Balfour, Huxley, Bentham and Hooker. In American Zoölogy the same difficulties were met and satisfactorily overcome by a rigid system of rules analogous to those here followed and now generally accepted by zoölogists and palaeontologists.

At an International Botanical Congress held at Paris in 1867, in which unfortunately the English botanists did not participate, A. DeCandolle presented a system of rules which, with modifications, were adopted, and, as above stated, are the foundation of the present rules of the botanists of the American Association. These rules were in part adopted also by the International Botanical Congress held at Genoa in 1892, and by the Austro-German botanists at

their meeting in September, 1894; while in the 9th Edition of the London Catalogue of British Plants published in 1895, these rules as respects the names of genera are largely followed; out of 440 genera in common with ours, all but 18 bear the same names as here given.*

It cannot be too often repeated that the object of these rules is not to introduce new names, but to restore the old and the true ones. The rules of the botanists of the American Association, adopted as above, are as follows. A brief explanation of the objects attained by them is appended:

RULE 1. Priority of publication is to be regarded as the fundamental principle of botanical nomenclature.

This has been generally acknowledged in theory as the guiding principle for determining which name should be borne by an animal or plant differently named by different writers. Various causes have retarded its application in practice. Its adoption is the only practicable way of securing stability to the original names. It has also been generally considered that the author who first defines or describes an animal or plant is entitled to the distinction of having his own name permanently associated with the name assigned to it; and this is also necessary for reasons of accuracy, because in numerous instances different plants have been called by the same name. In most cases the synonyms given in this work, with the date of publication, indicate the original name and the reason for its restoration under this rule.

RULE 2. The botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnaeus' "Species Plantarum" in 1753.

Some past date must of necessity be taken, in order to fix the limits within which priority shall be reckoned. Prior to the publication of "Species Plantarum" in 1753, the absence of any general binomial nomenclature, and the meagre, uncertain and inadequate descriptions by most prior authors, make any earlier date beset with difficulties. The result of much discussion has been to fix that work, with which modern nomenclature substantially begins, as the "point of departure." That date received the endorsement of the International Botanical Congress at Genoa in 1892, and has since been accepted by most botanists in America and Europe. Under this rule, no reference is made to names used prior to that work.

RULE 3. In the transfer of a species to a genus other than the one under which it was first published, the original specific name is to be retained.

From different views of the limits of genera, or from further knowledge of a plant, it often happens that it must be transferred to a different genus from that to which it was first assigned. Upon such a transfer, Rule 3 requires the original name of the species to be continued, and preserves its stability. Thus, out of the genus *Polypodium* of Linnaeus, three other groups have been since carved, viz., *Dryopteris* (*Aspidium*), *Cystopteris* and *Phegopteris*. The Long Beech Fern (p. 19), called *Polypodium Phegopteris* by Linnaeus, belongs to the generic group named *Phegopteris* by Fée in 1850. Rule 3 forbids the use of the new specific name, *polypodioides*, given to this plant by Fée, and requires the former specific name of Linnaeus to be preserved, and the plant thus becomes *Phegopteris Phegopteris*, an accidental re-duplication that occurs in but few instances in the whole field of nomenclature. The Twin-leaf was called *Podophyllum diphyllum* by Linnaeus in 1753, and *Jeffersonia binata* by Barton in 1793; Persoon in 1805 restored the Linnaean specific name, making the plant *Jeffersonia diphylla*, the correct binomial under the rule, and the one which the plant has borne for nearly one hundred years.

RULE 4. The original name is to be maintained, whether published as species, subspecies or variety.

Plants and animals are continually described as species which subsequent authors conclude are but varieties, and those first understood as varieties prove by subsequent study to be entitled to specific rank. Rule 4 maintains the first designation as the proper one, and avoids much confusion. Examples are numerous: See Figs. 28, 38, 61 *et seq.*

RULE 5. The publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species, respectively.

Thus in the case of the Long Beech Fern, above cited, though the specific name *polypodioides* is held to have been improperly given to it by Fée, the binomial, *Phegopteris polypodioides*, cannot be applied to any different plant; for if the earlier name should for any reason be lost or discarded, the name *polypodioides* must remain available as the next lawful substitute, and thus the principle of nomenclature—once a synonym always a synonym.

This rule operates to maintain one name only for a genus or species, and that, the first one applied to it, unless this was properly the name of another, in which case the next oldest

* For a fuller discussion of this subject see articles by Professor Lester F. Ward, in "Bulletin of the Torrey Botanical Club," 22: 308–329, from which the above summary is mostly taken; by Professor C. E. Bessey, in "American Naturalist," 29: 666–668; by Professor W. A. Kellerman, in "Journal of the Columbus Horticultural Society," 10: 7–10, and in "Botanical Gazette." 20: 468–470; by Professor Conway MacMillan, in "Metaspermae of the Minnesota Valley," 17; by Dr. B. L. Robinson, in "Botanical Gazette," 20: 97–103, 261–263; by Mr. F. V. Coville, in "Botanical Gazette," 20: 162–167, 320–322, 428, 429; by Dr. F. H. Knowlton, in "Botanical Gazette, 21: 82–85.

is to be used. By mistake or inadvertently the same name has frequently been given to several different genera or species, and it has repeatedly occurred that a name believed by the author to be a synonym is shown by another to be a valid designation.

RULE 6. Publication of a genus consists only, (1) in the distribution of a printed description of the genus named; (2) in the publication of the name of the genus and the citation of one or more previously published species as examples or types of the genus, with or without a diagnosis.

RULE 7. Publication of a species consists only, (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type.

RULE 8. Similar generic names are not to be rejected on account of slight differences, except in the spelling of the same word.

Thus *Epidendrum* and *Epidendron* are but different spellings of the same word; only one of them can therefore be used; the same of *Elodes* and *Elodea*.

RULE 9. In the case of a species which has been transferred from one genus to another, the original author must always be cited in parenthesis, followed by the author of the new binomial.

Thus *Dryopteris Lonchites* (L.) Kuntze (Fig. 26) is so cited, because Linnaeus first gave the plant the specific name *Lonchites*, while Kuntze first combined that name with the accepted genus *Dryopteris*.

RULE 10. In determining the name of a genus or species to which two or more names have been given by an author in the same volume, or on the same page of a volume, precedence shall decide.*

The Latin names of families have mostly been adopted as currently used, without reference to priority or terminations, as no rule on that subject has yet been formally adopted by botanists. It seems desirable, however, that the scientific names of families should also follow some uniform system, and as a very large proportion of botanical family names have long been formed by the termination *aceae* affixed to some prominent genus of the group, that this rule should be applied to the few remaining families otherwise named. All would thus be brought into a harmonious system of nomenclature, as the zoölogists have done by the adoption of the ending *idae* for all zoölogical families. The English common names of families are similarly adopted from some characteristic genus of the group; as Pink Family, Mustard Family, Mint Family, etc. The Carophyllaceae, in the absence of any genus *Caryophyllum*, might thus become Alsinaceae; the Cruciferae, Brassicaceae; the Labiatae, Menthaceae or Lamiaceae.

English Names of Plants.

The general desire for some English name to the different plants described has been met so far as possible. All names in common use have been inserted, so far as they have come to the authors' knowledge, except such as were merely local, or where they were too numerous for insertion. An exception has also been made in a few instances where a common name, from its false suggestion, as in the name of Dog's-tooth Violet (p. 420) for Adder's-tongue, is calculated to mislead as to the nature of the plant. Where no previous names in common use could be found, the names given are founded on some characteristic circumstance of description, habitat, site or author. Names used in England have been freely availed of, but the use of the same common name for different plants there and here has occasionally required the omission of one or the other: The use of the same name for different plants has been rejected, except where there is no such close affinity or resemblance between them as is likely to cause confusion.

Pronunciation.

In botanical names derived from Greek or Latin words, their compounds, or derivatives, the accent, according to the ordinary rule, is placed upon the penultimate syllable, if it is long in Latin quantity; otherwise, upon the antepenult. Many names, however, have been given to

*The rules have been closely followed in the publications of The United States National Museum; the Divisions of Botany and Forestry of the United States Department of Agriculture; The Missouri Botanical Garden; The Torrey Botanical Club; The University of Nebraska; The Botanical Survey of Nebraska; The Department of Botany of Columbia University; The Geological and Natural History Survey of Minnesota; The Botanical Survey of Indiana, and many other societies and institutions. Also in Professor Sargent's "Silva of North America;" Professor Underwood's "Native Ferns and their Allies;" Professor Kellerman's "Plants of Ohio;" Mr. Newhall's "Shrubs of Northeastern America;" and by a large number of other authors in less extensive writings.

plants in honor of individuals, which, having nothing Latin about them except the terminal form, and the pronunciation given to them by botanical authors being diverse, are here accented like the names of the persons, so far as euphony will permit. This rule is followed because it is believed to agree with the prevailing usage among botanists in ordinary speech; because it is in accord with the commemorative object of such names, which ought not to be obscured by a forced and unnatural pronunciation; and because the test applied to words properly Latin, viz., the usage of the Latin poets, cannot be applied to words of this class. We therefore give Tórreyi, Vâseyi, Câreyi, Jâmesii, Álleni, rather than Torrèyi, Vasèyi, Carèyi, Jamèsii, Allèni.

The acute accent is used to denote the short English sound only; as in bát, bét, bíd, nót, nút; the grave accent, to denote either of the other English sounds, whether long, broad or open; as *a* in bàle, bàll, bâr, bâre, lâud; *e* in ève, thère; *i* in pine, pique, machine; *o* in nòte, mòve; *u* in pure, rude. The accent for the short or longer English sound is based upon current English usage, as given in the chief English dictionaries from Walker's to the most recent, and without reference to the supposed ancient pronunciation.

Much diversity has been found in botanical works in the accented syllable of many modern Latin adjectives ending in -inus, -ina, -inum, derived from Latin words. As these adjectives are derived from Latin roots and are regularly formed, their pronunciation should properly follow classical analogies. When signifying, or referring to, time, material, or inanimate substances, they should, therefore, according to Andrews & Stoddard's rule, have the penult usually short, and the accent on the antepenult; as in gossípina, cannábina, secálina, salícina, amygdálina, and other adjectives derived from plant names, like the classic nárdinus, cýprinus, fáginus. When these adjectives have other significations than those above referred to, the penult under the ordinary Latin rule is usually long and accented; as in lupulîna, leporîna, hystricîna, like the classic ursîna, canîna.

The Use of Capital Letters.

In accordance with the recommendations of the Committee on Nomenclature of the Botanical Club of the American Association for the Advancement of Science, specific or varietal names derived from persons or places, or used as the genitive of generic names or as substantives, are printed with an initial capital letter. There is much difference of opinion as to the desirability of this practice, many botanists, and almost all zoölogists, following the principle of writing all specific names with a small initial letter. Should this custom prevail, much information concerning the history and significance of the specific names would be lost. Thus in the Tulip-tree, *Liriodendron Tulipifera*, the specific name *Tulipifera* was the ancient generic name; and the same with *Lythrum Salicaria*, *L. Hyssopifolia*, *L. Vulneraria*, and many other species. In all other forms of writing, personal adjectives such as *Nuttallii*, *Engelmanni* or *Torreyi* are printed with capitals. We adhere to the ordinary literary usage.

Varieties

are printed as trinomials, e. g., *Rynchospora glomerata paniculata*, the contraction var. or the Greek letters α or β commonly inserted between the specific and varietal name being dispensed with. The comma sometimes placed between the specific or varietal name and the name of the author is omitted, in accordance with the opinions of the same committee.

Assistance.

Cordial acknowledgment for assistance and advice is hereby tendered to Professor Thomas C. Porter, who has continuously, from the inception of the enterprise, coöperated in its execution by suggestion, information and the contribution of specimens, and who has read all the proofs; to Mr. Eugene P. Bicknell, who has supplied many specimens and read the proof-sheets; to Professor Lucien M. Underwood, for the text of the Pteridophyta; to Mr. Frederick V. Coville, for the text of the Juncaceae; to Dr. John K. Small, for the text of Polygonaceae and Euphorbiaceae, and for assistance and critical notes on many other families; to Mr. Geo. V. Nash, for the text of the Gramineae; to Professor F. Lamson-Scribner, for supervising the drawings of Gramineae, and for manuscript notes on many genera and species of that family; to Mr. Arthur Hollick, for supervision of the drawings; to Mr. Edmund P. Sheldon, for the text of Lemnaceae; to Mr. Charles E. Smith, for critical examination of the final proof-sheets, and to many others who by the contribution of specimens or notes have facilitated the production of the work.

The text for the families Typhaceae, Sparganiaceae, Naiadaceae, Scheuchzeriaceae, Araceae, Eriocaulaceae, Pontederiaceae, Smilaceae and Orchidaceae, was prepared by the late Rev. Thomas Morong, and has been printed with very little change from his manuscript.

Draughtsmen.

Most of the drawings have been executed by Mr. F. Emil; he has made all the figures of the Pteridophyta, Gymnospermae, and nearly all of the Monocotyledones, with the exception of those of Gramineae, Melanthaceae, Liliaceae and Convallariaceae; also nearly all of the apetalous Choripetalae, and a considerable portion of the Sympetalae. Miss Millie Timmerman (now Mrs. Heinrich Ries) drew the bulk of the polypetalous Choripetalae, the enlarged parts being mostly inserted by Mr. Arthur Hollick; she also did some work on several of the sympetalous families. Mr. Joseph Bridgham drew the Melanthaceae, Liliaceae and Convallariaceae; also the Ericaceae, Primulaceae and several related families. Mr. Theodor Holm drew most of the Gramineae. Mr. Hollick has made some drawings and numerous enlargements of special parts throughout the work. Miss Mary Knight and Mr. Rudolph Weber have also contributed drawings.

Symbols Used.

° is used after figures to indicate feet.
′ is used after figures to indicate inches.
″ is used after figures to indicate lines, or twelfths of an inch.
ˊ over syllables indicates the accent, and the short English sound of the vowel.
ˋ over syllables indicates the accent, and the long, broad, open or close English sound.

New York, August 15th, 1896.

ILLUSTRATED FLORA.

Subkingdom PTERIDÓPHYTA.*

FERNS AND FERN-ALLIES.

Plants containing woody and vascular tissues in the stem and producing spores asexually, which, on germination, develop small flat mostly green structures called prothallia (gametophyte). On these are borne the sexual reproductive organs, the female known as archegones, the male as antherids. From the fertilization of the oösphere of the archegone by spermatozoids produced in the antherids, the asexual phase (sporophyte) of the plants is developed; this phase is represented by an ordinary fern, lycopod or horsetail.

This subkingdom comprises about 4000 living species, of which more than three-fourths are confined to tropical regions. The number of extinct species known probably exceeds those living. They appeared on the earth in the early part of the Palaeozoic Era, reached their greatest abundance in Carboniferous Time, but have since been mainly replaced by plants of higher organization, so that at present they form only about one-fiftieth of the total flora. The time of year noted under each species indicates the season at which the spores are mature.

Family 1. OPHIOGLOSSÀCEAE Presl, Pterid. 6. 1836.

ADDER'S-TONGUE FAMILY.

More or less succulent plants consisting of a stem and leaf growing from a fleshy root. Sporanges formed of the interior tissues, naked, borne in a spike or panicle and opening at maturity by a transverse slit. Spores copious, yellow. Prothallium subterranean, devoid of chlorophyll.

Three genera, the following represented on both continents; the third, *Helminthostachys* is native of southern Asia.

Veins reticulate; sporanges cohering in a distichous spike. 1. *Ophioglossum.*
Veins free; sporanges distinct, borne in spikes or panicles. 2. *Botrychium.*

1. OPHIOGLÓSSUM L. Sp. Pl. 1062. 1753.

Low plants from a small fleshy rootstock, with slender fleshy roots, the bud for the following year formed at the side of the base of the stem. Leaves solitary, borne on the stem, simple in our species. Spike terminal, formed of the two rows of large coalescent sporanges. Veins of the leaf reticulate. Spores copious, sulphur-yellow. [Name from the Greek, signifying the tongue of a snake, in allusion to the narrow spike of sporanges.]

About 10 species of wide geographic distribution. Besides the following, three others are found in the southern United States, one of them extending to California.

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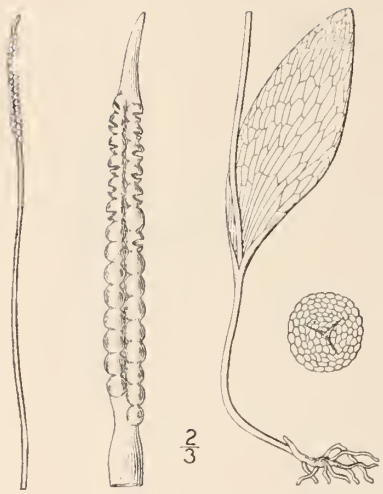
*Text contributed by Professor LUCIEN M. UNDERWOOD.



1. Ophioglossum vulgàtum L. Adder's-tongue. (Fig. 1.)

Ophioglossum vulgatum L. Sp. Pl. 1062. 1753.

Rootstock short, oblique; stem slender, erect, simple, glabrous, 2′–12′ high, bearing the sessile thin ovate or elliptic-oblong leaf (sterile segment) near its middle; sterile segment 1′–3′ long, ½′–1¼′ wide, rather firm in texture, distinctly reticulated; spike solitary, ½′–1′ long, erect, the axis extending beyond the sporanges into a point.

In moist meadows and thickets, or sometimes on dry hillsides, Prince Edward Island to Alaska, south to New Jersey, Kentucky and Arizona. Also in Europe, Asia, Africa and Australia. May–Aug.

2. BOTRÝCHIUM Sw. Schrad. Journ. Bot. 2 : 8. 1800.

Fleshy plants with short erect rootstocks, and clustered fleshy roots, the bud for the succeeding year imbedded in the base of the stem. Sterile portion (leaf) pinnately or ternately divided or compound, the fertile portion pinnate or tripinnate with sessile distinct sporanges in rows on either side of its branches, forming large panicles in some species. Veins free. Spores of various shades of yellow. [Greek, in allusion to the grape-like clusters of sporanges.]

About 10 species, mostly natives of the northern hemisphere, one or two occurring in Australia. Besides the following, another, *B. boreale*, occurs in Alaska.

Bud for the following year enclosed in the base of the stem; plants mostly small.
Vernation wholly straight; sterile portion simple or 2–5-lobed. 1. *B. simplex.*
Vernation partly inclined in one or both portions.
Buds glabrous; sterile portion pinnate; small plants, mature in early summer.
Sterile portion alone bent in vernation, its segments fan-shaped. 2. *B. Lunaria.*
Both portions bent in vernation; segments of sterile portion narrow. 3. *B. matricariaefolium.*
Bud pilose; sterile portion ternate, long-stalked; larger plants, mature in autumn. 4. *B. ternatum.*
Vernation wholly inclined, recurved in the fertile portion; sterile portion triangular, sessile. 5. *B. lanceolatum.*
Bud enclosed in a cavity at one side of the base of the stem; sterile portion ternate and compound; plant large. 6. *B. Virginianum.*

1. Botrychium símplex E. Hitchcock. Little Grape-fern. (Fig. 2.)

Botrychium simplex E. Hitchcock, Amer. Journ. Sci. 6 : 103. 1823.

Plant 2′–7′ high, slender, very variable. Sterile portion ovate, obovate or oblong, entire, lobed or pinnately parted, borne near the base of the stem or higher, sometimes above the middle; fertile portion a simple or slightly compound spike, sometimes reduced to only a few sporanges; spores large for the genus, minutely tuberculate; bud for the following year enclosed in the base of the stem; apex of both fertile and sterile portions erect in vernation.

In moist woods, meadows or swamps, Prince Edward Island to Maryland, west to Wyoming and California. Also in northern Europe. May–June.

2. Botrychium Lunària (L.) Sw. Moonwort. (Fig. 3.)

Osmunda Lunaria L. Sp. Pl. 1064. 1753.
Botrychium Lunaria Sw. Schrad. Journ. Bot. 2: 110. 1800.

Plant very fleshy, 2′–12′ high. Sterile portion usually sessile, borne at or above the middle of the stem, pinnate with 2–8 pairs of lunate or fan-shaped lobes which vary from crenate to entire and are either close and imbricated or distant; fertile portion 2–3-pinnate, often dense, 1′–2′ long, often about the height of the sterile; bud for the following year glabrous, enclosed in the base of the stem; apex only of the sterile portion bent over the nearly straight fertile portion in vernation.

Newfoundland to Alaska, south to Connecticut, central New York, Michigan, British Columbia and in the Rocky Mountains to Colorado, mostly in fields. Also in northern Europe and Asia. June–July.

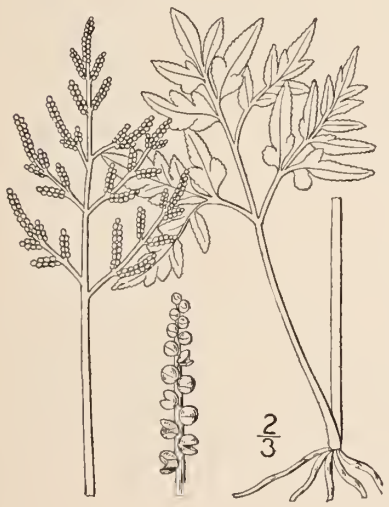
3. Botrychium matricariaefòlium A. Br. Matricary Grape-fern. (Fig. 4.)

Botrychium matricariaefolium A. Br. in Doell, Rhein. Fl. 24. 1843.

Plant 2′–12′ high, often very fleshy. Sterile portion borne above the middle of the stem, short-stalked, ovate or oblong, 1–2-pinnatifid or rarely 2-pinnate, with obtuse divisions and narrow toothed segments; midveins disappearing by continued branching; fertile portion 2–3-pinnate, often much branched; spores tuberculate; bud for the following year glabrous, enclosed in the base of the stem; apex of both sterile and fertile portions turned down in vernation.

In grassy woods and swamps, Nova Scotia to New Jersey, west to Ohio. Also in Washington and in Europe. May–June.

4. Botrychium ternàtum (Thunb.) Sw. Ternate Grape-fern. (Fig. 5.)



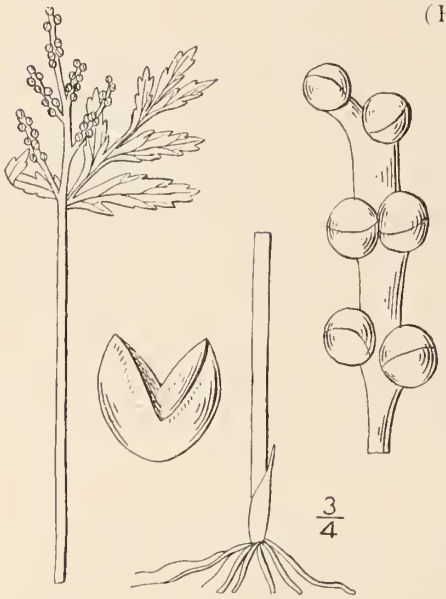
Osmunda ternata Thunb. Fl. Jap. 329. 1784.
Botrychium ternatum Sw. Schrad. Journ. Bot. 2: 111. 1800.

Plant 4′–16′ high, very fleshy, often slightly pubescent. Sterile portion long-stalked from near the base of the stem, broadly triangular, ternate, variously compound, the divisions stalked; ultimate segments varying from round-reniform to ovate-lanceolate, their margins entire or finely incised; bud for the following year pilose, enclosed in the base of the stem; apex of both portions bent down with a slight inward curve in vernation.

In moist meadows, woods and on hillsides, Nova Scotia to Florida, west to California. Also in Europe, eastern Asia and Australia. The sterile portion is persistent through the winter. Sept.–Dec.

Varies greatly; the large forms are known as var. *australe*, smaller forms with obliquely lanceolate segments as var. *obliquum*, similar forms with finely dissected segments as var. *dissectum*, and small forms with roundish-reniform segments as var. *lunarioides*.

5. **Botrychium lanceolàtum** (S. G. Gmel.) Angs. Lance-leaved Grape-fern. (Fig. 6.)



Osmunda lanceolata S. G. Gmel. Nov. Comment. Acad. Petrop. **12**: 516. 1768.

Botrychium lanceolatum Angs. Bot. Notiser, **1854**: 68. 1854.

Plant 3′–9′ high, somewhat fleshy. Sterile portion closely sessile at the summit of the stem, 1′ or more wide, 3-lobed or broadly triangular and 2-pinnatifid, the ultimate segments lanceolate, acute, oblique, entire or dentate; midvein continuous, with forking veinlets; fertile portion slightly overtopping the sterile, short-stalked, 2–3-pinnate; bud for the following year glabrous, enclosed in the base of the stem; fertile portion recurved its whole length with the shorter sterile portion reclined upon it in vernation.

In meadows, woods and swamps, Nova Scotia to Alaska, south to New Jersey, Ohio and in the Rocky Mountains to Colorado. Also in Europe and Asia. June–July.

6. **Botrychium Virginiànum** (L.) Sw. Virginia Grape-fern. (Fig. 7.)

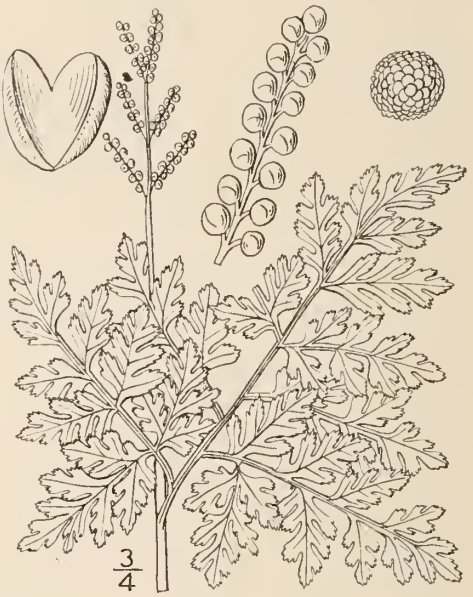
Osmunda Virginiana L. Sp. Pl. 1064. 1753.

Botrychium Virginianum Sw. Schrad. Journ. Bot. **2**: 111. 1800.

Botrychium gracile Pursh, Fl. Am. Sept. 656. 1814.

Plant 4′–2° high, the stem slender. Sterile portion nearly or quite sessile above the middle of the stem, spreading, thin, ternate with the primary divisions pinnate to 2-pinnate and the segments 1–2-pinnatifid; ultimate segments oblong, more or less toothed near the apex; epidermal cells flexuous; fertile portion long-stalked, 2–3-pinnate; bud for the following year pilose, enclosed in a glabrous cavity at one side of the lower part of the stem; fertile portion recurved its whole length, the sterile reclined upon it in vernation.

In rich woods, Nova Scotia to Florida, west to British Columbia and Arizona. Also in Europe and Asia. June–July.



Family 2. **OSMUNDÀCEAE** R. Br. Prodr. Fl. Nov. Holl. **1**: 161. 1810.

Royal Fern Family.

Large ferns with stout often erect rootstocks, 1–2 pinnate leaves coiled in vernation, the veins free, mostly forked, running to the margins of the pinnules or lobes. Sporanges large, globose, with mere traces of an elastic ring of cells or none, borne on modified contracted pinnae in the typical genus; in *Todea*, a genus of the southern hemisphere, in clusters (sori) on the lower surfaces of the pinnules.

Two living genera, *Osmunda* and *Todea*.

1. OSMÚNDA L. Sp. Pl. 1063. 1753.

Tall swamp ferns, growing in large crowns, with the fertile (spore-bearing) portions very much contracted, the short-pedicelled naked sporanges on the margins of their rachis-like divisions, which are destitute of chlorophyll. Veins forked, very regular and prominent. Sporauges thin, reticulated, opening by a longitudinal cleft into two halves, a few parallel thickening cells near the apex representing the rudimentary transverse ring. Spores copious, green. [From Osmunder, a name for the god Thor.]

Six species, mostly of the north temperate zone. Only the following occur in North America.

Leaves bipinnate, fertile at the apex. 1. *O. regalis.*
Sterile leaves bipinnatifid.
Pinnae of sterile leaf with a tuft of tomentum at base; fertile leaf distinct from sterile. 2. *O. cinnamomea.*
Pinnae of sterile leaf without a tuft of tomentum at base; leaves fertile in the middle. 3. *O. Claytoniana.*

1. Osmunda regàlis L. Royal Fern. (Fig. 8.)

Osmunda regalis L. Sp. Pl. 1065. 1753.

Rootstock stout, bearing a cluster of several tall bipinnate leaves, 2°–6° high, and 1° or more wide. Sterile pinnae 6′–12′ long, 2′–4′ wide, the pinnules oblong-ovate or lanceolate-oblong, sessile or slightly stalked, glabrous, finely serrulate, especially near the apex and occasionally crenate towards the base which is truncate, oblique or even cordate; fertile pinnules linear-cylindric, panicled at the summit, withering and shrivelling with age, greenish before maturity, but becoming dark brown after the spores have fallen.

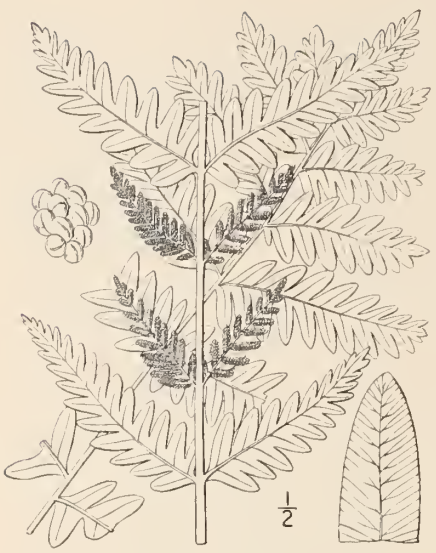
In swamps and marshes, New Brunswick to Florida, west to the Northwest Territory and Mississippi. Also in Mexico, Europe and Asia. Ascends to 3000 ft. in Virginia. May–July.

2. Osmunda cinnamòmea L. Cinnamon Fern. (Fig. 9.)

Osmunda cinnamomea L. Sp. Pl. 1066. 1753.

Rootstock very large, widely creeping, bearing a circular cluster of sterile leaves with one or more fertile ones within. Stipes 1° or more long, clothed with ferruginous tomentum when young, glabrous when old; sterile leaves 1°–5° long, glabrous when mature, except a small tuft of tomentum at the base of each pinna; pinnae linear-lanceolate, deeply pinnatifid into oblong obtuse segments; fertile leaf contracted, bipinnate, soon withering; sporanges cinnamon-colored after the copious green spores have been discharged.

In wet places, Nova Scotia to Minnesota, south to Florida and Mexico. Forms occur with leaves variously intermediate between the fertile and sterile; some being sterile at the apex, others in the middle, others on one side only. Ascends to 5600 ft. in Virginia. May–June.



3. Osmunda Claytoniàna L. Clayton's Fern. (Fig. 10.)

Osmunda Claytoniana L. Sp. Pl. 1066. 1753.
Osmunda interrupta Michx. Fl. Bor. Am. 2: 273. 1803.

Rootstock stout, bearing a circle of 2-pinnatifid leaves 2°–6° high, 6′–10′ wide; sterile pinnae without tufts of tomentum at the base, linear-lanceolate, deeply cleft into oblong obtuse segments, some of the leaves contracted in the middle and bearing 2–5 pairs of fertile pinnate pinnae with dense, cylindric divisions which are greenish at first, afterwards dark brown, finally withering; leaves clothed with tomentum when young, glabrous when mature, the fertile ones taller than the sterile, and finally widely recurving.

In swamps and moist soil, Newfoundland to Minnesota south to North Carolina and Missouri. Ascends to 5000 ft. in Virginia. Also in India. May–July.

Family 3. HYMENOPHYLLÀCEAE Gaud. in Freyc. Voy. 262. 1826.

FILMY-FERN FAMILY.

Membranaceous, mostly small ferns with filiform or slender creeping rootstocks. Leaves usually much divided. Sporanges sessile on a filiform, usually elongated receptacle, surrounded by a transverse ring which opens vertically.

Two genera, *Hymenophyllum* L., and the following, comprising some 200 species, very abundant in tropical regions, a few occurring in the temperate zones.

1. TRICHÓMANES L. Sp. Pl. 1097. 1753.

Delicate filmy ferns, the leaves usually much divided. Sporanges flattened, surrounded by a broad entire transverse ring opening vertically, sessile on the lower part of the slender filiform receptacle. Receptacle surrounded by a tubular or funnel-shaped indusium which is truncate or slightly 2-lipped. [Greek, in allusion to the thin hair-like segments of some species.]

About 100 species, mostly of tropical regions. Besides the following, another occurs in Alabama.

1. Trichomanes radìcans Sw. Bristle-fern. (Fig. 11.)

Trichomanes radicans Sw. Fl. Ind. Occ. 3: 1736. 1806.

Rootstock filiform, wiry, tomentose, creeping. Stipes (petioles) ascending, 1′–3′ long, naked or nearly so; leaves 2′–8′ long, 8″–1½′ wide, membranaceous, lanceolate or ovate-lanceolate, 2–3-pinnatifid; pinnae ovate, obtuse, the upper side of the cuneate base parallel with or appressed to the narrowly winged rachis; segments toothed or cut into linear divisions; indusia terminal on short lobes, 1–4 on a pinnule, the mouth slightly 2-lipped; receptacle more or less exserted, bristle-like, bearing the sessile sporanges mostly near the base.

On wet rocks, Kentucky to Florida and Alabama. Also in the West Indies, Mexico, tropical America, Europe, Asia and Africa. Summer.

Family 4. SCHIZAEÀCEAE Reichenb. Consp. 39. 1828.

Ferns of various habit, with simple or pinnate leaves. Sporanges borne in spikes or panicles, ovoid, sessile, provided with an apical ring, opening vertically by a longitudinal slit.

Five genera and about 75 species, the following genera represented in the north temperate zone, the others tropical in distribution.

Sporanges in close 2-ranked spikes; leaves filiform. 1. *Schizaea.*
Sporanges in ample panicles; pinnules palmate. 2. *Lygodium.*

1. SCHIZAÈA J. E. Smith, Mem. Acad. Tor. 5 : 419. *pl. 19. f. 9.* 1793.

Small slender ferns with filiform or linear leaves, the fertile distinct from the sterile. Sporanges sessile in close distichous spikes along the single vein of the narrow divisions of the fertile leaves, provided with a complete apical ring. [Greek, in allusion to the cleft leaves of some species.]

A genus of 16 species, of wide geographic distribution, mostly in tropical regions.

1. Schizaea pusílla Pursh. Curly-grass. (Fig. 12.)

Schizaea pusilla Pursh, Fl. Am. Sept. 657. 1814.

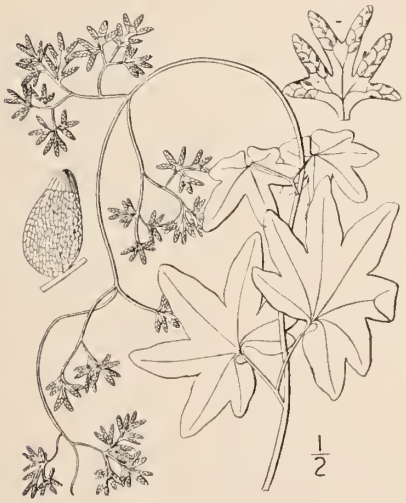
Sterile leaves linear, very slender and tortuous. Fertile leaves longer, 3′–5′ high, the fertile portion terminal, consisting of about 5 pairs of crowded pinnae, forming a distichous spike; sporanges ovoid or pyriform, sessile in two rows along the single vein of the narrow incurved linear divisions of the fertile leaf, partially concealed by its incurved margins which are hooded at the apex and ciliate; ring apical, the sporanges opening by a vertical slit.

In wet soil, pine barrens of New Jersey and in Nova Scotia. Rare and local. Aug.–Sept.

2. LYGÒDIUM Sw. Schrad. Journ. Bot. 2 : 106. 1800.

Twining or climbing ferns, the lower divisions sterile, variously stalked and lobed, the fertile terminal, panicled. Sporanges ovoid, solitary or two together in the axils of imbricated scale-like indusia, provided with an apical ring, opening vertically. Indusia fixed by their broad bases to short oblique veinlets. [Greek, in allusion to the flexible stipes.]

Sixteen species, mostly of tropical distribution.



1. Lygodium palmàtum (Bernh.) Sw. Climbing Fern. Hartford Fern. (Fig. 13.)

Gisopteris palmata Bernh. Schrad. Journ. Bot. 2: 129. 1800.
Lygodium palmatum Sw. Syn. Fil. 154. 1806.

Rootstock slender, creeping. Stipes slender, flexible and twining; leaves 1°–3° long, their short alternate branches 2-forked, each fork bearing a nearly orbicular 4–7-lobed pinnule which is more or less cordate at the base with a narrow sinus; surfaces naked; fertile pinnules contracted, several times forked, forming a terminal panicle; sporanges solitary, borne on the alternate veins which spring from the flexuous midvein of the segments, each covered by a scale-like indusium.

In moist thickets and open woods, Massachusetts to Pennsylvania, south to Florida and Tennessee. Ascends to 2100 ft. in eastern Pennsylvania. Summer.

Family 5. **POLYPODIÀCEAE** R. Br. Prodr. Fl. Nov. Holl. 1: 145. 1810.

FERN FAMILY.

Ferns of various habit, the rootstocks horizontal, often elongated, or short and erect, the leaves simple, pinnate, pinnatifid or decompound, coiled in vernation. Sporanges borne in clusters (sori) on the lower side or margins of the leaves or their segments, stalked, provided with a vertical ring of cells, opening transversely. Sori with or without a membranaceous covering (indusium). Prothallium green.

About 70 genera and 3000 species of very wide geographic distribution. The family includes by far the greater number of living ferns.

Spore-bearing leaves closely rolled together, with necklace-like segments. 1. *Onoclea.*

Leaves all flat or their edges only slightly revolute.
- Sori dorsal or marginal, provided with special indusia.
  - Sori roundish, indusia less than twice as long as broad.
    - Indusium wholly inferior.
      - Indusium roundish or stellate. 2. *Woodsia.*
      - Indusium cup-shaped or somewhat 2-valved. 3. *Dicksonia.*
    - Indusium partly inferior, fixed by a broad base and enclosing the sori like a hood. 4. *Cystopteris.*
    - Indusium superior, fixed by its centre or sinus. 5. *Dryopteris.*
  - Sori linear or oblong; indusia more than twice as long as broad.
    - Sori in chain-like rows parallel to the midribs or rachises. 7. *Woodwardia.*
    - Sori all oblique to the midrib or rachises; veins free.
      - Sori confluent in pairs with an apparently double indusium opening in the middle; leaf simple. 8. *Scolopendrium.*
      - Sori single on the upper side of a veinlet or rarely crossing it. 10. *Asplenium.*
    - Sori partly parallel to the midrib, partly oblique; veins united. 9. *Camptosorus.*
- Sori with marginal indusia formed of the more or less altered edge of the leaf.
  - Sporanges at the ends of veins, borne on a reflexed portion of the leaf. 11. *Adiantum.*
  - Sporanges borne on a continuous vein-like receptacle which connects the apices of the veins. 12. *Pteris.*
  - Sporanges at or near the ends of unconnected veins.
    - Leaves of two forms; stipes pale. 13. *Cryptogramma.*
    - Leaves uniform; stipes usually dark colored.
      - Sori mostly forming a continuous indusium around the segment. 14. *Pellaea.*
      - Sori minute; indusium usually interrupted, if continuous the segments small and bead-like. 15. *Cheilanthes.*
- Sori without indusia.
  - Sori linear and marginal. 16. *Notholaena.*
  - Sori roundish or not more than twice as long as broad.
    - Stipes articulated to the rootstocks; leaves in our species pinnatifid. 17. *Polypodium.*
    - Stipes not articulated to the rootstocks; leaves in our species 2–3-pinnatifid or ternate. 6. *Phegopteris.*

1. ONOCLÈA L. Sp. Pl. 1062. 1753.

Coarse ferns with the fertile leaves closely rolled up into necklace-like or berry-like segments, and entirely unlike the broad pinnatifid sterile ones. Sori round, borne on the back of the veins. Indusium very thin and membranous, hemispheric or hood-shaped, fixed at the inferior side of the sorus. Sporanges pedicelled, provided with a dorsal ring, bursting transversely. Fertile leaves unrolling at maturity, allowing the spores to escape, and remaining long after the sterile leaves have been killed by frost. [Name ancient, not originally applied to these plants.]

Three species, natives of cold and temperate regions. Only the following are known to occur in North America.

Fertile leaf bipinnate; veins anastomosing. 1. *O. sensibilis.*
Fertile leaf simply pinnate; veins free. 2. *O. Struthiopteris.*

1. Onoclea sensíbilis L. Sensitive Fern. (Fig. 14.)

Onoclea sensibilis L. Sp. Pl. 1062. 1753.

Rootstock rather slender, copiously rooting; fertile leaves 1°–2½° high, persistent over winter, much contracted, and with short pinnules rolled up into berry-like closed involucres forming a narrow panicle; sterile leaves 1°–4½° high, broadly triangular, deeply pinnatifid, the segments lanceolate-oblong, entire, undulate, or the lower pairs sinuate-pinnatifid; veins freely anastomosing; lowest segments tapering both ways from the middle; veins forming a somewhat regular series of semi-elliptic areoles next the midvein and numerous smaller areoles between this series and the margin.

In moist soil, Newfoundland and Ontario to the Northwest Territory, south to Florida, Louisiana and Kansas. Ascends to 3000 ft. in Virginia. Various intermediate forms between the sterile and fertile leaves occur. Sensitive to early frosts. Aug.–Nov.

2. Onoclea Struthiópteris (L.) Hoffm. Ostrich Fern. (Fig. 15.)

Osmunda Struthiopteris L. Sp. Pl. 1066. 1753.

Onoclea Struthiopteris Hoffm. Deutsch. Fl. 2 : 11. 1795.

Rootstock stout, ascending, bearing a circle of sterile leaves with one or more fertile ones within. Fertile leaves 1°–1½° high, simply pinnate with necklace-shaped pinnae which are formed of the closely revolute margins; sori crowded and confluent; sterile leaves 2°–7° high, 6′–15′ wide, broadly lanceolate, pinnate, much the broadest above the middle and gradually tapering below, the lower pinnae being gradually much reduced; veins pinnate, free and simple; texture firm; rootstocks stoloniferous.

In moist thickets, especially along streams, Nova Scotia to New Jersey, west to British Columbia and Illinois. Ascends to 2000 ft. in Vermont. Also in Europe and Asia. July–Oct.

2. WOÒDSIA R. Br. Trans. Linn. Soc. 11 : 170. 1812.

Small or medium-sized ferns, growing in rocky places, with 1–2-pinnate or pinnatifid leaves and round sori borne on the backs of simply forked free veins. Indusia inferior, thin and often evanescent, roundish or stellate, either small and open or early bursting at the top into irregular lobes or segments. Stipes often jointed above the base and separating at the joint. [Name in honor of Joseph Woods, 1776–1864, English architect and botanist.]

About 15 species, natives of temperate and cold regions. Besides the following, another occurs in the southwestern United States.

Indusium minute or evanescent, flat, concealed beneath the sorus, its margin cleft into slender hair-like segments.
- Stipes obscurely jointed near the base; cilia of the indusium inflexed over the sporanges.
  - Leaves with more or less rusty chaff underneath. 1. *W. Ilvensis.*
  - Leaves glabrous or nearly so.
    - Leaf lanceolate, not tapering below; pinnae cordate-ovate, 5–7-lobed. 2. *W. alpina.*
    - Leaf linear or linear-oblong, often tapering both ways; pinnae deltoid. 3. *W. glabella.*
- Stipes not jointed; cilia of the indusium very short, hidden by the sporanges.
  - Puberulent; indusium deeply cleft, ending in hairs with cylindric cells. 4. *W. scopulina.*
  - Leaves and stipes glabrous; indusium divided to centre into beaded hairs. 5. *W. Oregana.*

Indusium distinct, at first enclosing the sporanges, splitting into jagged lobes. 6. *W. obtusa.*

1. Woodsia Ilvénsis (L.) R. Br. Rusty Woodsia. (Fig. 16.)

Acrostichum Ilvense L. Sp. Pl. 1071. 1753.

Woodsia Ilvensis R. Br. Trans. Linn. Soc. 11: 173. 1812.

Rootstock short, caespitose. Leaves lanceolate, 4′–10′ long, pinnate, glabrous above, more or less covered with rusty chaff beneath, as are also the slender stipes; pinnae crowded, sessile, pinnately parted, the crowded segments obloug, obscurely crenate; stipes jointed near the base; sori borne near the margins of the segments, somewhat confluent when old; indusium minute, concealed beneath the sorus, its margin cleft into filiform segments which are inflexed over the sporanges and inconspicuous, especially when the latter have scattered their spores.

On exposed rocks, Labrador and Greenland to the Northwest Territory, south to North Carolina and Kentucky. Ascends to 5000 ft. in New Hampshire. Also in Europe and Asia. June–Aug.

2. Woodsia alpina (Bolton) S. F. Gray. Alpine Woodsia. (Fig. 17.)

Acrostichum alpinum Bolton, Fil. Brit. 76. 1790.

Acrostichum hyperboreum Liljeb. Act. Stockh. 201. 1793.

Woodsia hyperborea R. Br. Trans. Linn. Soc. 11: 173. 1812.

Woodsia alpina S. F. Gray, Nat. Arr. Brit. Pl. 2: 17. 1821.

Rootstock short, caespitose. Leaves narrowly oblong-lanceolate, 2′–6′ long, 8″–12″ wide, scarcely narrower below the middle; pinnae cordate-ovate or triangular-ovate, pinnately 5-7-lobed, glabrous or very nearly so on both surfaces; stipes jointed near the base; sori somewhat scattered on the segments; indusium as in the preceding species.

On moist rocks, Labrador to Alaska, south to Maine, northern New York and western Ontario. Ascends to 4200 ft. in Vermont. July–Aug.

3. Woodsia glabélla R. Br. Smooth Woodsia. (Fig. 18).

Woodsia glabella R. Br. App. Franklin's Journ. 754. 1823.

Rootstock small, caespitose. Stipes obscurely jointed at the base; leaves linear or narrowly lanceolate, 2′–5′ long, 4″ 8″ wide; pinnae deltoid to ovate, the lower remote, obtuse, crenately lobed, often somewhat smaller than the middle ones, glabrous or nearly so; sori scattered on the segments; indusium minute, membranous, with 6–10 radiating segments, covered by the sporanges, its filamentous segments only inflexed over them when young as in the two preceding species.

On moist rocks, Labrador to Alaska, south to New Hampshire, Vermont, northern New York and the north shore of Lake Superior. Also in arctic and alpine Europe and Asia. Summer.

4. Woodsia scopulìna D. C. Eaton. Rocky Mountain Woodsia. (Fig. 19.)

Woodsia scopulina D. C. Eaton, Can. Nat. 2: 90. 1865.

Rootstock short, creeping, densely chaffy. Stipes 2′–4′ long, not jointed, pnberulent like the rachis and lower surface of the leaf with minute flattened hairs and stalked glands; leaves lanceolate, 6′–12′ long, tapering from abont the middle to both ends; pinnae nnmerous, oblong-ovate, pinnatifid into 10–16 oblong toothed segments; indusium hidden beneath the sporanges, very deeply cleft into short cilia with cylindric cells

In crevices of rocks, northern Minnesota and western Ontario to Oregon, south in the Rocky Mountains to Arizona and in the Sierra Nevada to California. Summer.

5. Woodsia Oregàna D. C. Eaton. Oregon Woodsia. (Fig. 20.)

Woodsia Oregana D. C. Eaton, Can. Nat. 2: 90. 1865.

Woodsia obtusa var. *Lyallii* Hook. Syn. Fil. 48. 1868.

Rootstock short. Stipes and leaves glabrons throughout; stipes not jointed, brownish below; leaves 2′–10′ long, elliptic-lanceolate, the sterile shorter than the fertile; pinnae triangular-oblong, obtnse, pinnatifid; lower pinnae reduced in size and somewhat remote from the others; rachis straw-colored; segments oblong or ovate, dentate or crenate, the teeth often reflexed and covering the snbmarginal sori; indnsia minute, concealed by the sporanges, divided almost to the centre into a few beaded hairs.

On rocks, northern Michigan and Minnesota and Manitoba to British Columbia, sonth in the Rocky Mountains to Arizona and in the Sierra Nevada to California. July-Aug.

6. Woodsia obtùsa (Spreng.) Torr. Blunt-lobed Woodsia. (Fig. 21.)

Polypodium obtusum Spreng. Anleit. 92. 1804.

Hypopeltis obtusa Torr. Comp. 380. 1824.

Woodsia obtusa Torr. Cat. Pl. in Geol. Rep. N. Y. 195. 1840.

Rootstock short, creeping. Stipes not jointed, pale green, 3′–6′ long; leaves broadly lanceolate, 6′–15′ long, minutely glandnlar-pnbescent, nearly 2-pinnate; pinnae rather remotc, triangnlar-ovate, or oblong, pinnately parted into obtnse oblong crenate-dentate segments; veins forked and bearing the sori on or near the minntely toothed lobes; indusinm conspicnous, at first enclosing the sporanges, at length splitting into several jagged lobes, which are mnch wider than those in any of the preceding species.

On rocks, Nova Scotia (according to Macoun) and Maine to northern New York, Wisconsin and British Columbia, south to Georgia, Alabama, the Indian Territory and Arizona. Ascends to 2200 ft. in Virginia. July-Aug.

3. DICKSÒNIA L'Her. Sertum Angl. 30. 1788.

Large ferns with 2-3-pinnatifid leaves, and creeping or erect rootstocks, many tropical species arborescent. Sori small, globular, marginal or submarginal. Sporanges borne in an elevated globular receptacle, enclosed in the membranous cup-shaped inferior indusium which is open at the top and on the outer side adherent to a reflexed toothlet of the leaf. Sporanges pedicelled, provided with a vertical ring which bursts transversely. Veins always free. [Name in honor of James Dickson, English nurseryman and botanist, 1738–1822.]

About 50 species, of wide distribution, the greater number in tropical America and Polynesia.

1. Dicksonia punctilóbula (Michx.) A. Gray. Hay-scented Fern. (Fig. 22.)

Nephrodium punctilobulum Michx. Fl. Bor. Am. 2: 268. 1803.
Dicksonia pilosiuscula Willd. Enum. 1076. 1809.
Dicksonia punctilobula A. Gray, Man. 628. 1848.

Rootstock slender, extensively creeping, not chaffy. Stipes stout, chaffless, pale green and sweet-scented; leaves 1°–3° long, 5′–9′ wide, ovate-lanceolate, acute or acuminate, frequently long-attenuate, usually 3-pinnatifid, thin and delicate; rachis and under surface minutely glandular and pubescent; sori minute, each on a recurved toothlet, usually one at the upper margin of each lobe; sporanges few; indusium cup-shaped with a delicate membranous irregular margin.

In various situations, most abundant on open hillsides, New Brunswick and Ontario to Indiana and Minnesota (according to Upham), south to Alabama and Tennessee. Ascends to 5600 ft. in Virginia. Aug.

4. CYSTÓPTERIS Bernh. Schrad. Neues Journ. Bot. 1: Part 2, 26. 1806.

Delicate rock ferns with slender stipes, 2–4-pinnate leaves, and roundish sori borne on the backs of the veins. Indusium membranous, hood-like, attached by a broad base on its inner side and partly under the sorus, early opening and somewhat evanescent. Veins free. Sporanges pedicelled, provided with a transversely bursting vertical ring. [Greek, signifying Bladder-fern, in allusion to the inflated indusium.]

Five species, natives of the north temperate zone. Only the following known in North America.

Leaves ovate-lanceolate or lanceolate, 2–3-pinnate.
  Leaves broadest at base, long-tapering, bearing bulblets beneath. 1. *C. bulbifera.*
  Leaves scarcely broader at base, short-pointed; no bulblets. 2. *C. fragilis.*
Leaves deltoid-ovate, 3-4-pinnate. 3. *C. montana.*

1. Cystopteris bulbífera (L.) Bernh. Bulblet Cystopteris. (Fig. 23.)

Polypodium bulbiferum L. Sp. Pl. 1091. 1753.
Cystopteris bulbifera Bernh. Schrad. Neues Journ. Bot. 1: Part 2, 26. 1806.

Rootstock short, copiously rooting. Stipes 4′–6′ long, light colored; leaves elongated, lanceolate from a broad base, 1°–2½° long, 2–3-pinnatifid or pinnate; pinnules crowded, toothed or pinnatifid; rachis wingless, commonly bearing underneath in the axils of the pinnae and segments, large fleshy bulblets which fall away and propagate the plant; indusia short, truncate on the free side, early thrown back and withering so that the sori appear naked at maturity.

On wet rocks and in ravines, especially on limestone, Quebec to Wisconsin, south to Tennessee and Arkansas. Ascends to 3500 ft. in Virginia. July-Aug.

2. Cystopteris frágilis (L.) Bernh. Brittle Fern. (Fig. 24.)

Polypodium fragile L. Sp. Pl. 1091. 1753.

Cystopteris fragilis Bernh. Schrad. Neues Journ. Bot. 1 : Part 2, 27. 1806.

Rootstock short. Stipes 4′–8′ long; leaves thin, oblong-lanceolate, only slightly tapering below, 4′–10′ long, 2–3-pinnatifid or pinnate; pinnae lanceolate-ovate, irregularly pinnatifid, with a broad central space and bluntly or sharply toothed segments decurrent along the margined or winged rachis, without bulblets; indusia narrow or acute at the free end, early withering and exposing the sori which finally appear naked; texture membranous.

On rocks and in moist grassy woods, Newfoundland to Alaska, south to Georgia and Arizona. Also in South and Central America, Europe, Asia and New Zealand; almost cosmopolitan in distribution. Ascends to 5000 ft. in New Hampshire. May-July.

3. Cystopteris montàna (Lam.) Bernh. Mountain Cystopteris. (Fig. 25.)

Polypodium montanum Lam. Fl. France, 1 : 23. 1778.

Cystopteris montana Bernh. Schrad. Neues Journ. Bot. 1 : Part 2, 26. 1806.

Rootstock slender, widely creeping. Stipes 6′–9′ long, slender; leaves deltoid-ovate, 3–4-pinnate, about 6′ long and broad, the lowest pinnae deltoid-lanceolate and much larger than the upper, their inferior pinnules 1′–1½′ long; segments deeply divided into oblong lobes, deeply toothed; sori numerous; indusia acute, soon withering, exposing the sori and causing them to appear naked at maturity.

On rocks, Labrador and Quebec to British Columbia, south to the north shore of Lake Superior, and in the Rocky Mountains to Colorado. Also in northern Europe and Asia. Aug.

5. DRYÓPTERIS Adans. Fam. Pl. 2: 20. 1763.

[Aspidium Sw. Schrad. Journ. Bot. 2 : 4. 1800.]

Ferns with 1–3-pinnate or pinnatifid leaves and round sori usually borne on the backs of the veins, the fertile and sterile leaves similar in outline. Indusium flat or flattish, orbicular and peltate or cordate-reniform, superior, fixed by its sinus or depressed centre. Stipe continuous, not jointed with the rootstock. Sporanges abundant, pedicelled, the vertical ring bursting transversely. Veins free in the northern species, uniting occasionally or even freely in some of the southern. [Greek, signifying Oak-fern, in allusion to the forest habitat of most species.]

About 350 species, of wide geographic distribution. Besides the following some 10 others occur in the southern and western parts of North America. The first three species are sometimes separated as a distinct genus. (*Polystichum* Roth, 1797.)

Indusium orbicular, entire, peltate, fixed by the depressed centre.
Leaves once pinnate.
Stipes short; lower pinnae much reduced. 1. *D. Lonchitis.*
Stipes longer; lower pinnae usually little reduced. 2. *D. acrostichoides.*
Leaves bipinnate. 3. *D. Braunii.*
Indusium cordate-reniform or orbicular, fixed by the sinus.
Texture thin-membranous; veins simple or once forked; leaves pinnatifid.
Lower pinnae very much reduced. 4. *D. Noveboracensis.*
Lower pinnae little smaller than the middle ones.
Veins 1–2-forked; sori crowded, 10–12 to a segment. 5. *D. Thelypteris.*
Veins simple; sori larger, distinct, 4–10 to a segment. 6. *D. simulata.*
Texture firmer, sometimes subcoriaceous; veins forking freely.
Leaves 2-pinnatifid or 2-pinnate; segments not spinulose.
Leaves small, narrowly lanceolate. 7. *D. fragrans.*
Leaves larger, mostly 1½°–5° high.
Indusia large, thinnish and flat.
Pinnae widest at the base. 8. *D. cristata.*
Pinnae widest at the middle. 9. *D. Goldieana.*
Indusia convex, without marginal glands.
Sori near the margin. 10. *D. marginalis.*
Sori near the midvein. 11. *D. Filix-mas.*
Leaves 2-pinnate or 3-pinnatifid; segments spinulose-toothed.
Leaves ovate-lanceolate, usually not narrowed below; scales of stipes usually with a dark centre. 12. *D. spinulosa.*
Leaves elongated-lanceolate, usually narrowed at the base; scales of the stipes pale brown. 13. *D. Boottii.*

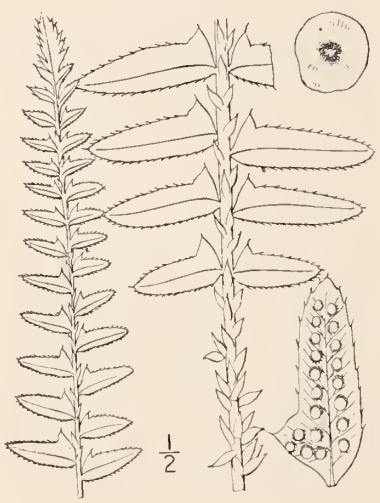
1. Dryopteris Lonchitis (L.) Kuntze. Holly-fern. (Fig. 26.)

Polypodium Lonchitis L. Sp. Pl. 1088. 1753.
Aspidium Lonchitis Sw. Schrad. Journ. Bot. 2: 30. 1800.
Dryopteris Lonchitis Kuntze, Rev. Gen. Pl. 813. 1891.

Rootstock short, stout, densely chaffy. Stipes 1′–5′ long, bearing large dark brown scales with some smaller ones; leaves rigid, coriaceous, evergreen, narrowly lanceolate in outline, once pinnate; pinnae broadly lanceolate-falcate, 1′–2′ long, acute or acuminate at the apex, strongly auricled on the upper side at the base and obliquely truncate on the lower, densely spinulose-dentate, the lowest commonly triangular and shorter; sori large, at length contiguous, borne nearer the margin than the midrib, commonly quite close to the margin; indusium orbicular, entire, fixed by its depressed centre.

On rocks, Labrador to Alaska, south to Ontario and British Columbia, and in the Rocky Mountains to Utah. Also in northern Europe and Asia. Aug.

2. Dryopteris acrostichoides (Michx.) Kuntze. Christmas Fern. (Fig. 27.)



Nephrodium acrostichoides Michx. Fl. Bor. Am. 2: 267. 1803.
Aspidium acrostichoides Sw. Syn. Fil. 44. 1806.
Dryopteris acrostichoides Kuntze, Rev. Gen. Pl. 812. 1891.

Rootstock stout, creeping. Stipes 5′–7′ long, densely chaffy; leaves lanceolate in outline, 6′–2° long, 3′–5′ wide, rigid, evergreen, subcoriaceous, once pinnate; pinnae linear-lanceolate, somewhat falcate, 1′–3′ long, acutish at the apex, half halberd-shaped at the base, bristly with appressed teeth, the lower little smaller, sometimes deflexed; fertile fronds contracted at the summit, bearing the large contiguous sori near the middle, which soon cover the whole lower surface; indusium orbicular, entire, fixed by its depressed centre, persistent.

In woods and on hillsides, most abundant in rocky places, New Brunswick and Nova Scotia to Florida, west to Ontario, Wisconsin and Mississippi. Ascends to 2700 ft. in Maryland. July–Aug.

Forms with cut-lobed or incised pinnae are known as var. *Schweinitzii;* occasional forms are 2-pinnatifid.

3. Dryopteris Braùnii (Spenner) Underw. Braun's Holly-fern. (Fig. 28.)

Aspidium Braunii Spenner, Fl. Frib. 1 : 9. 1825.
Aspidium aculeatum var. *Braunii* Doell, Rhein. Fl. 21. 1843.
Dryopteris aculeata var. *Braunii* Underw. Native Ferns, Ed. 4, 112. 1893.

Rootstock stout. Stipes 4′–5′ long, chaffy with both broad and narrow brown scales; leaves oblong-lanceolate, not coriaceous, 2-pinnate, the rachis chaffy, at least below; pinnae numerous, close together, lanceolate or linear-lanceolate, broadest at the base, cut to the midvein into ovate or oblong pinnules; middle pinnae 2½′–4′ long, the lower gradually shorter; pinnules truncate and nearly rectangular at the base, acute or obtuse, sharply toothed and beset with long soft hairs and scales; sori small, mostly nearer the midvein than the margin; indusium orbicular, peltate, entire.

In rocky woods, Quebec to Alaska, south to Maine, the mountains of Pennsylvania, and to Michigan and British Columbia. Ascends to 5000 ft. in Vermont. Aug.

4. Dryopteris Noveboracénsis (L.) A. Gray. New York Fern. (Fig. 29.)

Polypodium Noveboracense L. Sp. Pl. 1091. 1753.
Aspidium Noveboracense Sw. Syn. Fil. 55. 1806.
Dryopteris Noveboracensis A. Gray, Man. 630. 1848.

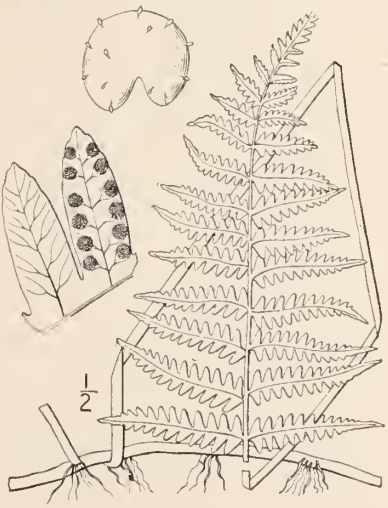
Rootstock slender, widely creeping. Leaves lanceolate, tapering both ways from the middle, 1°–2° long, 4′–6′ wide, membranous, long-acuminate at the apex, once pinnate; pinnae lanceolate, sessile, long-acuminate, deeply pinnatifid, ciliate and finely pubescent beneath, 1½′–3′ long, the two or more lower pairs gradually shorter and deflexed, commonly distant; segments flat, oblong, obtuse, the basal ones often enlarged; veins simple or those of the basal lobes forked; sori not confluent, borne near the margin; indusium minute, reniform, delicate, gland-bearing, fixed by its sinus.

In moist woods and thickets, Newfoundland to Ontario and Minnesota, south to North Carolina and Arkansas. Ascends to 5000 ft. in Virginia. Sometimes sweet-scented in drying. July-Sept.

5. Dryopteris Thelýpteris (L.) A. Gray. Marsh Shield-fern. (Fig. 30.)

Acrostichum Thelypteris L. Sp. Pl. 1071. 1753.
Aspidium Thelypteris Sw. Schrad. Journ. Bot. 2: 40. 1800.
Dryopteris Thelypteris A. Gray, Man. 630. 1848.

Rootstock slender, creeping. Leaves lanceolate or oblong-lanceolate, scarcely narrower at the base than at the middle, 1°–2½° long, 4′–6′ wide, short-acuminate at the apex, membranous, once pinnate; pinnae linear-lanceolate, short-stalked or sessile, mostly horizontal, acuminate at the apex, nearly truncate at the base, 1½′–3′ long, slightly pubescent beneath, deeply pinnatifid; segments oblong, obtuse or appearing acute from the strongly revolute margins; veins regularly once or twice forked; sori crowded, 10–12 to each segment; indusia reniform, slightly glandular or glabrous.



In marshes and wet woods, rarely in dry soil, New Brunswick to Manitoba, south to Florida, Louisiana and Kansas. Ascends to 2000 ft. in Vermont. Also in Europe and Asia. Summer.

6. Dryopteris simulàta Davenp. Massachusetts Shield-fern. (Fig. 31.)

Aspidium simulatum Davenp. Bot. Gaz. 19 : 495. 1894.
Dryopteris simulata Davenp. Bot. Gaz. 19 : 497. 1894.
As synonym.

Rootstock wide-creeping, slender, brownish; stipes 6′–20′ long, straw-colored, dark brown at base, with deciduous scales; leaves 8′–20′ long, 2′–7′ wide, oblong-lanceolate, tapering to an acuminate apex (abruptly tapering in the fertile leaf), little or not at all narrowed at the base; pinnae 12–20 pairs, lanceolate, pinnatifid, the segments obliquely oblong, obtuse, entire, slightly revolute in the fertile leaf; surfaces finely pubescent, especially near the midribs; texture rather thin; veins simple, nearly straight; sori rather large, somewhat distant, 4–10 to each segment; indusia finely glandular at the margins, withering-persistent.

In woodland swamps, New Hampshire to the Indian Territory. Close to the preceding species. Summer.

7. Dryopteris fràgrans (L.) Schott. Fragrant Shield-fern. (Fig. 32.)

Polypodium fragrans L. Sp. Pl. 1089. 1753.
Aspidium fragrans Sw. Schrad. Journ. Bot. 2 : 35. 1800.
Dryopteris fragrans Schott, Gen. Fil. 1834.

Rootstock stout, chaffy with brown shining scales. Stipes 2′–4′ long, chaffy; leaves lanceolate, firm, glandular and aromatic, pinnate or nearly 2-pinnate, acuminate at apex, narrowed to the base, 3′–12′ long; pinnae deeply pinnatifid, numerous, lanceolate, acute, ½′–1¼′ long; segments oblong, obtuse, dentate or nearly entire, nearly covered by the large sori; indusium thin, nearly orbicular, persistent long after the sporanges have matured, its margin ragged and sparingly gland-bearing, the sinus narrow.

On rocks, Labrador to Alaska, south to Maine, Vermont, the Adirondack Mountains and Wisconsin. Ascends to 4000 ft. in Vermont. Also in Greenland, Europe and Asia.

8. Dryopteris cristàta (L.) A. Gray. Crested Shield-fern. (Fig. 33.)

Polypodium cristatum L. Sp. Pl. 1090. 1753.
Aspidium cristatum Sw. Schrad. Journ. Bot. 2: 37. 1800.
Dryopteris cristata A. Gray, Man. 631. 1848.

Rootstock stout, creeping, densely chaffy. Stipes of the sterile leaves 2′–5′ long, those of the fertile 6′–10′ long; leaves linear-oblong or lanceolate, acuminate at the apex, gradually and slightly narrowed to the base, rather firm, 1°–2½° long, 4′–6′ wide, pinnate; pinnae lanceolate or triangular-ovate, acuminate, deeply pinnatifid or the lower pinnate, the segments 6–10 pairs, serrate or incised; sori about midway between the margin and midrib; indusium thin, orbicular-reniform, glabrous.

In wet woods and swamps, Newfoundland to Manitoba, south to Kentucky and Arkansas. Ascends to 2700 ft. in Maryland. Also in Europe and Asia. July-Aug.

Dryopteris cristàta Clintoniàna (D. C. Eaton) Underw. Native Ferns, Ed. 4, 115. 1893.
Aspidium cristatum var. *Clintonianum* D. C. Eaton in A. Gray, Man. Ed. 5, 665. 1867.

Leaves 2½°–4° long, with oblong-lanceolate pinnae, which are broadest at the base and 4′–6′ long; segments 8–16 pairs, linear-oblong, obscurely serrate; veins pinnately forking, bearing the sori near the midvein. Maine and Ontario to New Jersey, Pennsylvania and Wisconsin.

9. Dryopteris Goldieàna (Hook.) A. Gray. Goldie's Fern (Fig. 34.)

Aspidium Goldieanum Hook. Edinb. Philos. Journ. 6: 333. 1822.
Dryopteris Goldiana A. Gray, Man. 631. 1848.

Rootstock stout, widely creeping, chaffy. Stipes 10′–18′ long, chaffy at least below; leaves broadly ovate, rather firm, 2°–4° long, usually 1° or more wide, glabrous or nearly so, dark green above, pinnate or nearly 2-pinnate; lower pinnae broadly lanceolate, widest at about the middle, 6′–9′ long, 1′–2′ wide, pinnately parted into about 20 pairs of oblong-linear subfalcate segments which are serrate with appressed teeth; sori very near the midrib, close together but distinct, large; indusium orbicular, fixed by its narrow sinus, glabrous, persistent.

In rich woods, New Brunswick to Minnesota, south to North Carolina and Tennessee. Ascends to 5000 ft. in Virginia and to 2500 ft. in Vermont. July-Aug.

10. Dryopteris marginàlis (L.) A. Gray. Evergreen Wood-fern. (Fig. 35.)

Polypodium marginale L. Sp. Pl. 1091. 1753.
Aspidium marginale Sw. Syn. Fil. 50. 1806.
Dryopteris marginalis A. Gray, Man. 632. 1848.

Rootstock stout, ascending, densely chaffy with dark brown shining scales. Stipes 3′–8′ long, chaffy below; leaves borne in a crown, ovate-oblong or ovate-lanceolate in outline, subcoriaceous, 6′–2½° long, pinnate or 2-pinnate, acuminate at the apex, slightly narrowed at the base; pinnae numerous, lanceolate, nearly sessile, glabrous, 2′–5′ long, the lower broader and shorter than the middle ones, the upper pinnatifid, the lower pinnately parted into oblong, sometimes slightly falcate obtuse entire dentate or pinnately lobed pinnules; sori distinct, close to the margin, covered by the glabrous indusium which is fixed by its sinus.

In rocky woods and on banks, Prince Edward Island to the Northwest Territory, south to Alabama and Arkansas. Ascends to 5000 ft. in Virginia. A hybrid with *D. cristata* is described. Leaves evergreen. July-Aug.

11. Dryopteris Filix-Más (L.) Schott. Male Fern. (Fig. 36.)

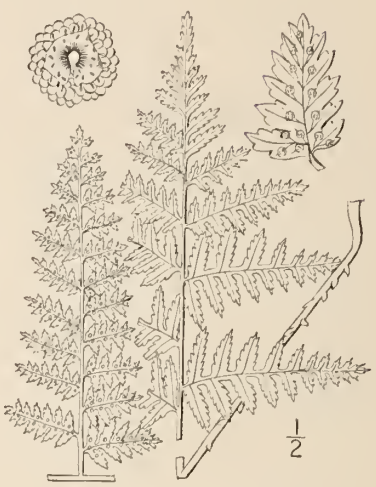
Polypodium Filix-mas L. Sp. Pl. 1090. 1753.
Aspidium Filix-mas Sw. Schrad. Journ. Bot. 2: 38. 1800.
Dryopteris Filix-mas Schott, Gen. Fil. 1834.

Rootstock stout, ascending or erect, chaffy. Stipes 4′–6′ long, very chaffy below; leaves broadly oblong-lanceolate, acute, or acuminate at the apex, slightly narrowed to the base, 1°–3° long, rather firm, half evergreen, pinnate or partly 2-pinnate; pinnae lanceolate, broadest at the base, gradually acuminate to the apex, 3′–6′ long, pinnatifid almost to the rachis or pinnately divided into oblong glabrous lobes or pinnules; pinnules slightly dentate, incised or nearly entire; sori large, borne near the midvein, more numerous on the lower halves of the segments; indusium firm, convex, glabrous, orbicular-reniform, fixed by its sinus.

In rocky woods, Labrador to Alaska, south to northern Michigan and British Columbia, and in the Rocky Mountains to Arizona. Also in Greenland, Europe and Asia, and in the Andes of South America. Aug. The rootstock of this and the preceding species furnish the drug Filix-mas, used as a vermifuge.

12. Dryopteris spinulòsa (Retz) Kuntze. Spinulose Shield-fern. (Fig. 37.)

Polypodium spinulosum Retz, Fl. Scand. Ed. 2, 250. 1795.
Aspidium spinulosum Sw. Schrad. Journ. Bot. 2: 38. 1800.
Dryopteris spinulosa Kuntze, Rev. Gen. Pl. 813. 1891.



Rootstock stont, chaffy. Stipes 6′–18′ long, bearing a few pale brown deciduons scales; leaves ovate-lanceolate, 2-pinnate, the pinnae oblique to the rachis, elongated-triangnlar, rather thin, the lower pairs broadly triangnlar, slightly shorter than the middle ones; pinnules oblique to the midrib, connected by a very narrow wing, oblong, incised or pinnatifid with spinnlose-toothed lobes; indnsinm glabrons, orbicnlar-reniform, fixed by its sinns.

In rich woods, Newfoundland to Alaska and Washington, south to Kentucky and Michigan. Ascends to 5000 ft. in Virginia. Also in Europe and Asia. July-Aug.

Dryopteris spinulòsa intermèdia (Muhl.) Underw. Native Ferns, Ed. 4. 116 (1893).

Aspidium intermedium Muhl.; Willd. Sp. Pl. 5: 262. 1810.
Dryopteris intermedia A. Gray, Man. 630. 1848.
Aspidium spinulosum var. *intermedium* D. C. Eaton in A. Gray, Man. Ed. 5, 665. 1867.

Scales of the stipes few, brown with a darker centre; leaves oblong-ovate, 2-3-pinnate, the pinnae oblong-lanceolate, spreading, the lowest unequally triangular-ovate; pinnules crowded, pinnately divided; indusium delicate, beset with stalked glands. Labrador to Alaska, south to North Carolina and Missouri.(?) We have chosen this commonest American form for illustration.

Dryopteris spinulòsa dilatàta (Hoffm.) Underw. Native Ferns, Ed. 4, 116. 1893.

Polypodium dilatatum Hoffm. Deutsch. Fl. 2: 7. 1795.
Aspidium spinulosum var. *dilatatum* Hook. Brit. Fl. 444. 1830.
Dryopteris dilatata A. Gray, Man. 631. 1848.

Scales of the stipe large, brown with a darker centre; leaves broadly ovate or triangular-ovate, commonly 3-pinnate; pinnules lanceolate-oblong, the lowest often much elongated; indusium glabrous. Newfoundland to Washington and Alaska, south along the Alleghenies to North Carolina and Tennessee and to Ohio and Nebraska. Also in Europe and Asia.

13. Dryopteris Boòttii (Tuckerm.) Underw. Boott's Shield-fern. (Fig. 38.)

Aspidium Boottii Tuckerm. Hovey's Mag. 9: 145. 1843.
Aspidium spinulosum var. *Boottii* D. C. Eaton in A. Gray, Man. Ed. 5, 665. 1867.
Dryopteris Boottii Underw. Native Ferns, Ed. 4, 117. 1893.

Rootstock stont, ascending. Stipes 8′–12′ long, covered, at least below, with thin pale-brown scales; leaves elongated-oblong or elongated-lanceolate in ontline, thin, acuminate at the apex, slightly narrowed at the base, nearly or qnite 2-pinnate, 1°–2½° long, 3′–5′ wide; pinnae lanceolate, long-acnminate, broadest at the nearly sessile base; pinnnles broadly oblong, very obtnse, the lower pinnatifid; sori distinct, borne abont half way between the midvein and margin; indusinm orbicnlar-reniform, minutely glandular.

In woods, Nova Scotia to Minnesota, south to southern New York, Delaware and Maryland. Ascends to 2000 ft. in Vermont. Also in northern Europe and Asia. July-Sept.

6. PHEGÓPTERIS Fée, Gen. Fil. 242. 1850–52.

Medium sized or small ferns with 2–3-pinnatifid or ternate leaves and small round sori borne on the backs of the veins below the apex. Stipe not jointed with the rootstock. Indnsinm none. Fertile (spore-bearing) and sterile leaves similar. Sporanges pedicelled, provided with a vertical ring, bursting transversely. [Greek, signifying Beech-fern.]

About 100 species of wide geographic distribution. Besides the following another occnrs in western North America.

Leaves triangular, 2-pinnatifid; pinnae sessile, adnate to the winged rachis.
- Leaves longer than broad, usually dark green. 1. *P. Phegopteris.*
- Leaves as broad as long, or broader, usually light green. 2. *P. hexagonoptera.*

Leaves ternate, with the three divisions petioled; rachis wingless. 3. *P. Dryopteris.*

1. Phegopteris Phegópteris (L.) Underw. Long Beech-fern. (Fig. 39.)

Polypodium Phegopteris L. Sp. Pl. 1089. 1753.
Phegopteris polypodioides Fée, Gen. Fil. 243. 1850–52.
Phegopteris Phegopteris Underw.; Small, Bull. Torr. Club, 20: 462. 1893.

Rootstock slender, creeping, somewhat chaffy at least when young. Stipes 6′–9′ long; leaves triangular, thin, mostly longer than wide, 4′–9′ long, 3′–6′ wide, acuminate at the apex, pubescent, especially on the veins beneath; pinnae lanceolate or linear-lanceolate, acuminate at the apex, sessile, broadest above the base, pinnately parted very nearly to the rachis into oblong obtuse entire segments, the lower pair deflexed and standing forward; basal segments, at least those of the upper pinnae, decurrent and adnate to the winged rachis; sori small, borne near the margin.

In moist woods and on hillsides, Newfoundland to Alaska, south to the mountains of Virginia, and to Michigan and Washington. Ascends to 4000 ft. in Vermont. Also in Europe and Asia. Aug.

2. Phegopteris hexagonóptera (Michx.) Fée. Broad Beech-fern. (Fig. 40.)

Polypodium hexagonopterum Michx. Fl. Bor. Am. 2: 271. 1803.
Phegopteris hexagonoptera Fée, Gen. Fil. 243. 1850–52.

Rootstock slender, creeping, chaffy, somewhat fleshy. Stipes 8′–18′ long, straw-colored, naked; leaves triangular, as broad as or broader than long, 7′–12′ wide, slightly pubescent and often slightly glandular beneath, acuminate at the apex; uppermost pinnae oblong, obtuse, dentate or entire, small, the middle ones lanceolate, acuminate, the very large lowest pair broadest near the middle, pinnately parted nearly to the midvein into linear-oblong obtuse segments; sori mostly near the margin.

In dry woods and on hillsides, Quebec to Minnesota, south to Florida and Louisiana. Ascends to 4000 ft. in North Carolina. Leaves fragrant. Aug.

3. Phegopteris Dryópteris (L.) Fée. Oak-fern. (Fig. 41.)

Polypodium Dryopteris L. Sp. Pl. 1093. 1753.
Phegopteris Dryopteris Fée, Gen. Fil. 243. 1850–52.

Rootstock slender, creeping. Stipes slender, 4′–12′ long, chaffy at least near the base; leaves thin, broadly triangular, almost glabrous, 4′–8′ wide, ternate, the three primary divisions stalked, pinnate or partly 2-pinnate, the terminal one slightly larger, all spreading more or less at right angles to the stipe; pinnules lanceolate or oblong-lanceolate, obtuse or subacute, sessile; segments oblong, obtuse, entire or crenate, close together.

In moist woods, thickets and swamps, Newfoundland to Alaska, south to Virginia, Minnesota, Oregon, and in the Rocky Mountains to Colorado. Ascends to 2400 ft. in the Catskills. Also in Europe and Asia. Aug.

Phegopteris Dryópteris Robertiàna (Hoffm.) Davenp. Cat. Davenp. Herb. Suppl. 47. 1883.
Polypodium Robertianum Hoffm. Deutsch. Fl. 1795.
Phegopteris calcarea Fée, Gen. Fil. 243. 1850–52.

Stipes 6′–10′ long, straw-colored when dry; leaves 6′–8′ long, mostly erect, 5′–7′ wide, deltoid-ovate, 2-pinnate, the lowest pinnae much the largest, pinnatifid or again pinnate; upper pinnae smaller, pinnatifid, lobed or entire; sori numerous. Labrador to Iowa and Idaho. Also in Europe.

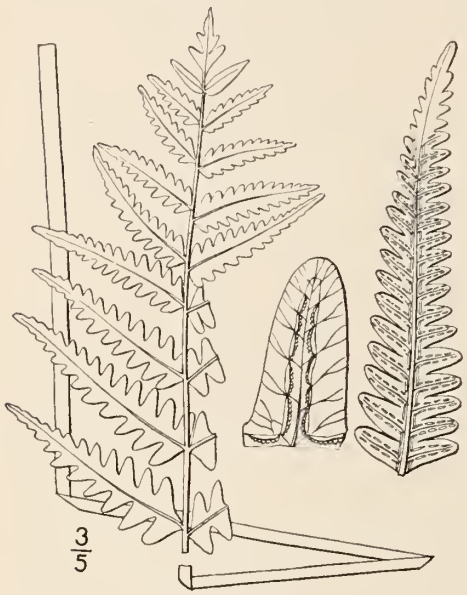
7. WOODWÁRDIA J. E. Smith, Mem. Acad. Tor. 5: 411. 1793.

Large and rather coarse ferns of swamps or wet woods, with pinuate or nearly 2-piunate leaves aud oblong or linear sori, suuk in cavities of the leaf aud arrauged in chain-like rows, parallel to the margins of the piunae. Leaves all alike or the piunae of the fertile ones much narrower thau those of the sterile. Indusia subcoriaceous, fixed by their outer margins to a veinlet and covering the cavity like a lid. Veins more or less reticulated. Sporanges pedicelled, provided with a vertical riug, bursting transversely. [Name in houor of Thomas Jenkinson Woodward, 1745–1820, English botanist.]

Six species, mostly of the north temperate zone. Besides the following, another occurs on the Pacific coast of North America.

Leaves uniform; veins free between the sori and the margin. 1. *W. Virginica.*
Leaves of two kinds; veins everywhere anastomosing. 2. *W. areolata.*

1. Woodwardia Virgínica (L.) J. E. Smith. Virginia Chain-fern. (Fig. 42.)



Blechnum Virginicum L. Mant. 2: 307. 1771.
Woodwardia Virginica J. E. Smith, Mem. Acad. Tor. 5: 412. 1793.

Rootstock long, stout, horizontal, subterranean or creeping, chaffy. Stipes stout, 12′–18′ loug, uearly or quite naked, dark-colored below; leaves obloug-lanceolate, acute at the apex, narrowed at the base, 1°–2° long, 6′–9′ wide, pinnate; pinuae linear-lanceolate, usually alteruate or some of them opposite, coriaceous, glabrous, acuminate at the apex, sessile, 3′–6′ long, deeply pinuatifid into ovate or obloug obtuse segmeuts, their margins miuutely serrulate; veins formiug a single series of areolae on either side of the midvein, the sori borne on the outer curving veinlets; sterile aud fertile leaves similar in outline.

In swamps, often in deep water, Nova Scotia to Ontario and Michigan, south to Florida, Louisiana and Arkansas. Ascends to 1300 ft. in Pennsylvania. Also in Bermuda. June–July.

2. Woodwardia areolàta (L.) Moore. Net-veined Chain-fern. (Fig. 43.)

Acrostichum areolatum L. Sp. Pl. 1069. 1753.
Woodwardia angustifolia J. E. Smith, Mem. Acad. Tor. 5: 411. 1793.
Woodwardia areolata Moore, Index Filicum, xlv. 1857.

Rootstock slender, widely creeping, chaffy. Leaves of two kinds, the fertile taller than the sterile aud borne on longer stipes, 1°–2° high, their piuuae much contracted, narrowly linear, 3′–5′ long, 2″–3″ wide, distant, their bases connected by a very narrow wing to the rachis or quite distiuct; sterile leaves deltoid-ovate, membranous, broadest at the base, or sometimes with one or two small pinnae below, the apex acuminate, the segments lanceolate or oblong-lanceolate, acute or acuminate, minutely serrulate, sometimes undulate, their bases connected by a rather broad rachis-wiug; veins forming numerous areolae.

In swamps and moist soil, Maine to Florida, Tennessee, Louisiana, and Arkansas; also in Michigan. Ascends to 3000 ft. in North Carolina. Aug.–Oct.

8. SCOLOPÉNDRIUM Adans. Fam. Pl. 2: 20. 1763.

Large ferns with oblong or strap-shaped mostly entire leaves, and linear elongated sori which are almost at right angles to the midrib and contiguous in pairs, one on the upper side of a veinlet, the other on the lower side of the next contiguous veinlet, thus appearing to have a double indusium opening longitudinally along its middle. Sporanges pedicelled, the ring vertical, bursting transversely. [Greek, in allusion to the centipede, *Scolopendra.*]

Five species, mainly of temperate regions. Only the following is known to occur in North America.

1. Scolopendrium Scolopéndrium (L.) Karst. Hart's-tongue. (Fig. 44.)

Asplenium Scolopendrium L. Sp. Pl. 1079. 1753.
Scolopendrium vulgare J. E. Smith, Mem. Acad. Tor. 5: 421. 1793.
Scolopendrium Scolopendrium Karst. Deutsch. Fl. 278. 1880–83.

Rootstock short, erect or ascending, chaffy with light brown scales. Stipes 2′–6′ long, fibrillose-chaffy below or sometimes up to the base of the leaf; leaves simple, bright green, firm, 7′–18′ long, 1′–2½′ wide, cordate at the base, the margins entire or undulate, the lower surface of the midrib sometimes chaffy; pairs of sori distinct, 2″–7″ long; conspicuous on the lower surface, the sporanges dark brown at maturity; veins free, usually once forked near the midrib.

On shaded cliffs of the coniferous limestone, Chittenango Falls and Jamesville, N. Y.; near South Pittsburg, Tenn.; Owen Sound, Ont., New Brunswick and Mexico. Widely distributed in Europe, Asia and Africa. Very variable in form in the Old World.

9. CAMPTOSÒRUS Link, Hort. Berol. 2: 69. 1833.

Slender ferns with tapering simple entire or undulate leaves, bearing linear or oblong sori several times longer than broad, irregularly scattered on either side of the reticulate veins or sometimes crossing them, partly parallel to the midrib and partly oblique to it, the outer ones more or less approximate in pairs. Indusium membranous. Sporanges pedicelled, provided with a vertical ring which opens transversely. [Greek, referring to the bent or curved sori.]

Two species, the following of eastern North America, the other of northern Asia.

1. Camptosorus rhizophýllus (L.) Link. Walking-fern. (Fig. 45.)

Asplenium rhizophylla L. Sp. Pl. 1078. 1753.
Camptosorus rhizophyllus Link, Hort. Berol. 2: 69. 1833.

Rootstock short, usually creeping, somewhat chaffy. Stipes light green, 1′–6′ long, tufted, spreading; leaves rather thin, lanceolate, simple, long-acuminate at the apex, cordate, hastate or rarely narrowed at the base, 4′–9′ long, sometimes with a more or less elongated pair of basal auricles; tip of the leaf and sometimes the tip of one or both of the basal auricles rooting and forming a new plant by the ultimate withering away of its tissue, but commonly two or sometimes as many as four plants are found connected; sori usually numerous, very irregularly scattered on the lower surface.

On dry rocks, preferring limestone, Quebec to Ontario and Minnesota, south to North Carolina and Kansas. Ascends to 2500 ft. in Virginia. Aug.-Oct.

10. ASPLÈNIUM L. Sp. Pl. 1078. 1753.

Large or small ferns with simple lobed pinnate 2–3-pinnate or pinnatifid leaves, and linear or oblong sori obliqne to the midribs or rachises. Leaves uniform, or the fertile sometimes different from the sterile. Veins free in our species. Indusia straight or curved, opening towards the midribs when single. Sporanges pedicelled, provided with an elastic ring, bnrsting transversely. [Ancient Greek name; some species were supposed to be remedies for diseases of the spleen.]

A genus of some 350 species, of very wide geographic distribution. Besides the following, five others occur in Florida and three in the western parts of the United States.

Sori straight or rarely slightly cnrved, attached to the upper side of a vein; leaves mostly small (except in No. 7).
- Leaves pinnatifid or pinnate below, tapering to a point.
  - Stipes blackish below; lobes rounded or the lowest acuminate. 1. *A. pinnatifidum.*
  - Stipes blackish throughout; lobes acute or acuminate. 2. *A. ebenoides.*
- Leaves once pinnate.
  - Pinnae 3″–12″ long, mostly blunt.
    - Rachis chestnut-brown or blackish.
      - Pinnae auricled at the upper side of the base.
        - Pinnae opposite, oblong; rachis dark brown or black. 3. *A. parvulum.*
        - Pinnae partly alternate, lanceolate; rachis chestnut-brown. 4. *A. platyneuron.*
      - Pinnae not auricled, partly alternate, partly opposite. 5. *A. Trichomanes.*
    - Rachis green; pinnae not auricled. 6. *A. viride.*
  - Pinnae 2′–5′ long, acute or acuminate. 7. *A. angustifolium.*
- Leaves 2–3-pinnatifid.
  - Stipes green; leaves ovate-deltoid; pinnules fan-shaped, veins flabellate. 8. *A. Ruta-muraria.*
  - Stipes dark at the base, green above.
    - Leaves ovate-lanceolate, broadest near the base. 9. *A. montanum.*
    - Leaves lanceolate, broadest above the middle. 10. *A. fontanum.*
  - Stipes chestnut-brown throughout, as also the lower part of the rachis. 11. *A. Bradleyi.*

Sori usually more or less curved, sometimes horseshoe-shaped, often crossing to the outer or lower side of the veinlet; large ferns. (No. 7 may be looked for here.)
- Leaves 2-pinnatifid; segments blunt, scarcely crenate. 12. *A. acrostichoides.*
- Leaves 2-pinnate; pinnules acute, toothed or pinnatifid. 13. *A. Filix-foemina.*

1. Asplenium pinnatífidum Nutt. Pinnatifid Spleenwort. (Fig. 46.)

Asplenium pinnatifidum Nutt. Gen. 2: 251. 1818.

Rootstock short, creeping, branched, chaffy. Stipes tufted, polished, blackish below, green above, 2′–5′ long, somewhat chaffy below, at least when yonng; leaves broadly lanceolate in outline, 3′–10′ long, firm, tapering upward to a long narrow point, pinnatifid or the lower parts pinnate; lowest pinnae or occasionally several pairs sometimes tapering to a point like that of the apex of the leaf; lobes or pinnae rounded or the lowest acnminate; sori commonly nnmerous, straight or slightly cnrved.

On rocks, New Jersey and Pennsylvania to Illinois, south to Georgia, Alabama and Arkansas. Ascends to 3000 ft. in North Carolina. The end of the long tip of the leaf sometimes takes root as in the Walking-fern. July–Oct.

2. Asplenium ebenoides R. R. Scott. Scott's Spleenwort. (Fig. 47.)

Asplenium ebenoides R. R. Scott, Journ. Roy. Hort. Soc. 87. 1866.

Rootstock short, chaffy. Stipes blackish throughout, tufted, 1½′–4′ long; leaves lanceolate in outline, variable in size and length, 3′–9′ long, 1′–2′ wide at the base, firm, tapering into a very long narrow acuminate apex, pinnatifid, or commonly pinnate below, the segments or pinnae lanceolate from a broad base, acute or acuminate, irregular in length, the lower sometimes shorter than those just above; sori several on each segment, straight or slightly curved; indusium narrow, reflexed when the sporanges are mature.

On limestone, Connecticut to Indiana, south to Alabama. Rare and local except in the last named locality. Ascends to 1400 ft. in Virginia. The plant usually occurs with *Camptosorus rhizophyllus* and *Asplenium platyneuron* and is suspected of being a hybrid between them.

3. Asplenium párvulum Mart. & Gal. Smal Spleenwort. (Fig. 48.)

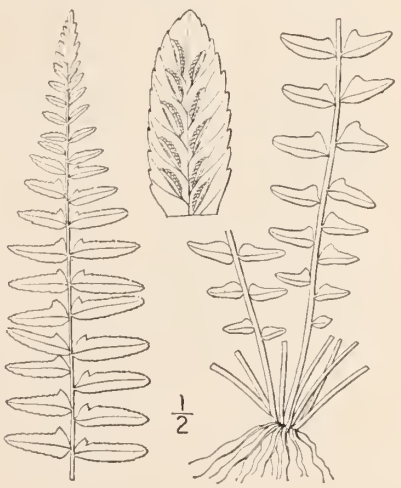
Asplenium parvulum Mart. & Gal. Mem. Acad. Brux. 15: [reprint 60.] 1842.

Rootstock short, creeping, chaffy with black stiff scales. Stipes tufted, blackish and shining, 1′–2′ long; leaves rather firm, linear-oblong or linear-oblanceolate, 3′–10′ long, 5″–12″ wide, once pinnate; pinnae 2″–6″ long, mostly opposite, oblong, obtuse, entire or crenulate, auricled on the upper side and nearly sessile, the middle ones the longest, the lower gradually shorter and reflexed; rachis dark brown or black; sori oblong, short, borne about midway between the midrib and the margin of the pinnae, nearly or quite straight.

On limestone, Virginia to Florida, west to Missouri, Texas and New Mexico. Ascends to 2400 ft. in Virginia. Also in Mexico. June–Oct.

4. Asplenium platyneùron (L.) Oakes. Ebony Spleenwort. (Fig. 49.)

Acrostichum platyneuros L. Sp. Pl. 1069. 1753.
Asplenium ebeneum Ait. Hort. Kew. 3: 462. 1789.
Asplenium platyneuron Oakes; D. C. Eaton, Ferns N. A. 1: 24. 1879.



Rootstock short. Stipes densely tufted, purplish-brown and shining, 1′–4′ long; leaves linear, 8′–15′ long, ½′–1½′ wide, firm, once pinnate, the rachis chestnut-brown; pinnae 20–40 pairs, lanceolate, subfalcate, alternate or partly so, sessile, crenate, serrate or incised, auricled on the upper side at the base and occasionally also on the lower; lower pinnae gradually smaller and oblong or triangular; sori 8–12 on each side of the midrib of the pinnae, becoming crowded at maturity.

On rocks and banks, preferring limestone soil, Maine and Ontario to Florida, west to Colorado, the Indian Territory, Louisiana and Texas. Ascends to 4200 ft. in North Carolina. July–Sept.

5. Asplenium Trichómanes L. Maidenhair Spleenwort. (Fig. 50.)

Asplenium Trichomanes L. Sp. Pl. 1080. 1753.

Rootstock short, nearly erect, chaffy with blackish scales. Stipes densely tufted, commonly numerous, 1′–5′ long, purplish-brown and shining; leaves linear in outline, 3′–8′ long, 6″–10″ wide, rather rigid, once pinnate, evergreen; pinnae oval or roundish-oblong, inequilateral, partly opposite, partly alternate, or nearly all opposite, cuneate at the base, the point of attachment to the dark brown rachis narrow, their margins slightly crenate; sori 3–6 on each side of the forking and evanescent midrib, short, narrowed at either end; sporanges dark brown when mature.

On rocks, preferring limestone, throughout nearly the whole of North America except the extreme north. Ascends to 2500 ft. in Vermont. Also in Europe, Asia, South Africa and the Pacific Islands. July–Sept.

6. Asplenium víride Huds. Green Spleenwort. (Fig. 51.)

Asplenium viride Huds. Fl. Angl. 385. 1762.

Rootstock stout, creeping, chaffy with brown nerveless scales. Stipes numerous, densely tufted, brownish below, green above; leaves linear-lanceolate, 2′–8′ long, 4″–10″ wide, once pinnate, pale green, soft, herbaceous or almost membranous; rachis green; pinnae 12–20 pairs, ovate or rhomboid, deeply crenate, obtuse, unequal sided, their upper edges narrowed suddenly at the base, the lower obliquely truncate; sori oblong and numerous or scattered and fewer.

On rocks, New Brunswick to British Columbia, south to the Green Mountains of Vermont. Also in northern Europe and Asia. Summer.

7. Asplenium angustifòlium Michx. Narrow-leaved Spleenwort. (Fig. 52.)

Asplenium angustifolium Michx. Fl. Bor. Am. 2: 265. 1803.

Rootstock stout, creeping, rooting along its whole length. Stipes growing in a crown, brownish or green above, chaffless, 8′–12′ long, sometimes slightly scaly toward the base; leaves lanceolate in outline, 1°–2° long, once pinnate, glabrous; pinnae 20–30 pairs, linear-lanceolate, or those of the sterile leaves lanceolate, acuminate at the apex, obtuse or truncate at the base, 2′–5′ long, flaccid, the margins entire or slightly crenulate; fertile leaves commonly taller than the sterile, narrower, their pinnae generally much narrower, often falcate; sori 20–30 on each side of the midrib, linear, close together, the indusia at length concealed by the mature sporanges.

In moist woods and shaded ravines, Quebec to Wisconsin, south to Virginia and Kentucky. Ascends to 1700 ft. in the Adirondacks, to 2300 in the Catskills. Aug.

8. Asplenium Rùta-murària L. Wall Rue Spleenwort. (Fig. 53.)

Asplenium Ruta-muraria L. Sp. Pl. 1081. 1753.

Rootstock short, ascending. Stipes tufted, naked, slender, green, 2′–3′ long; leaves ovate or deltoid-ovate in outline, 2′–5′ long, glabrous, evergreen, 2–3-pinnate or pinnatifid above; pinnae and pinnules stalked; pinnules rhombic or obovate, mostly obtuse, dentate or incised, cuneate at the base; veins flabellate; sori few, linear-oblong, confluent when mature and covering nearly the whole pinnule, the indusium membranaceous and delicate.

On limestone, Vermont to Michigan, south to Alabama and Missouri. Ascends to 2100 ft. in Virginia. Also in Europe, Asia and northern Africa. July–Sept.

9. Asplenium montànum Willd. Mountain Spleenwort. (Fig. 54.)

Asplenium montanum Willd. Sp. Pl. 5: 342. 1810.

Rootstock short, chaffy at the summit. Stipes tufted, naked, slender, blackish at the base, green above, 2′–3′ long; leaves ovate-lanceolate in outline, acuminate at the apex, rather firm, 1–2-pinnate; lower pinnae longest, pinnate or pinnatifid, the lobes or segments ovate or oblong; upper pinnae less divided, merely toothed or incised; veins obscure; sori linear-oblong, short, the lower ones sometimes double, usually abundant, often confluent at maturity and concealing the narrow membranous indusia.

On dry and moist rocks, Connecticut and New York to Georgia, west to Ohio and Arkansas. Ascends to 4500 ft. in North Carolina. June–Aug.

10. Asplenium fontànum (L.) Bernh. Rock Spleenwort. (Fig. 55.)

Polypodium fontanum L. Sp. Pl. 1089. 1753.
Asplenium fontanum Bernh. Schrad. Journ. Bot. 1: 314. 1799.

Rootstock short, ascending, clothed with narrow dark scales at the apex. Stipes tufted, 1′–3′ long, somewhat blackish at the base especially on the inner side, usually glabrous; leaves lanceolate, broadest above the middle, thin, 2–3-pinnate, 3′–6′ long, 6″–1½′ wide, acuminate at the apex, narrowed to the base; pinnae 10–15 pairs, the segments deeply dentate with spinulose teeth; sori only 1 to 4 on each segment, covered with a membranous subentire indusium, rarely confluent.

On rocks, Lycoming Co., Pa., and Springfield, Ohio. The rarest North American fern; common in Europe. Summer.

11. Asplenium Brádleyi D. C. Eaton. Bradley's Spleenwort. (Fig. 56.)

Asplenium Bradleyi D. C. Eaton, Bull. Torr. Club, 4: 11. 1873.

Rootstock short, chaffy with brown scales. Stipes tufted, slender, 2′–3′ long, chestnut-brown throughout; leaves oblong-lanceolate or oblong, acuminate at the apex, not narrowed at the base, pinnate with 8–12 pairs of short-stalked or sessile, oblong-ovate pinnae, the lower again pinnatifid or pinnate with oblong obtuse lobes or pinnules, which are toothed at the apex, the upper pinnatifid with dentate or nearly entire lobes; rachis brown; sori short, borne near the midrib, covered with the narrow indusium until maturity.

On rocks, preferring limestone, New York to Georgia and Alabama, west to Arkansas. Local. July–Sept.

12. Asplenium acrostichoides Sw. Silvery Spleenwort. (Fig. 57.)

Asplenium acrostichoides Sw. Schrad. Journ. Bot. 2: 54. 1800.
Asplenium thelypteroides Michx. Fl. Bor. Am. 2: 265. 1803.

Rootstock slender, sinuous, creeping. Stipes 8′–12′ long, straw-colored, somewhat chaffy below at least when young; leaves lanceolate in outline, 1°–3° long, 6′–12′ wide, acute or acuminate at the apex, narrowed to the base, pinnate-pinnatifid; pinnae linear-lanceolate, sessile, acuminate, deeply pinnatifid into numerous oblong obtuse or subacute, slightly crenate segments; sori crowded, slightly curved or straight, the lower ones often double; indusium light-colored and somewhat shining when young.

In rich moist woods, Nova Scotia to Minnesota, south to Alabama and Kentucky. Ascends to 5000 ft. in Virginia. Also in eastern Asia. Aug.–Oct.

13. Asplenium Filix-fœmina (L.) Bernh. Lady-fern. (Fig. 58.)

Polypodium Filix-foemina L. Sp. Pl. 1090. 1753.
Asplenium Filix-foemina Bernh. Schrad. Neues Journ. Bot. 1: Part 2, 26. 1806.

Rootstock creeping, rather slender for the size of the plant. Stipes tufted, 6′–10′ long, straw-colored, brownish or reddish; leaves broadly oblong-ovate or oblong-lanceolate, acuminate at the apex, 1°–3° long, 2-pinnate; pinnae lanceolate, acuminate, short-stalked or the upper ones sessile, 4′–8′ long; pinnules oblong-lanceolate, incised or serrate, their lobes or teeth often again toothed, those toward the ends of the pinnae confluent by a very narrow margin to the secondary rachis; sori short, the indusia straight or variously curved, sometimes horseshoe-shaped.

In woods, thickets, and by walls and fences, Nova Scotia to Alaska, south to Florida, Louisiana and Arizona, thus throughout nearly all of North America. Ascends to 6000 ft. in North Carolina, and to 2000 ft. in Vermont. Also in Europe and Asia. June–Aug.

11. ADIÁNTUM L. Sp. Pl. 1094. 1753.

Graceful ferns of rocky hillsides, woods and ravines, with much divided leaves and short marginal sori borne on the under side of the reflexed and altered portion of the pinnule which serves as an indusium. Stipes and branches of the leaves very slender or filiform, polished and shining. Sporanges borne at the ends of free forking veins, provided with a vertical ring which bursts transversely. [Name ancient.]

A genus of 80 or 90 species, mostly of tropical America. Besides the following another occurs in Florida, one in Texas and one in California.

Leaves 2-pinnate, ovate-lanceolate in outline. 1. *A. Capillus-Veneris.*
Leaves dichotomously forked with pinnate branches. 2. *A. pedatum.*

1. Adiantum Capíllus-Véneris L. Venus-hair Fern. (Fig. 59.)

Adiantum Capillus-Veneris L. Sp. Pl. 1096. 1753.

Rootstock creeping, rather slender, chaffy with light-brown scales. Stipes very slender, black, or nearly so and shining, 3′–9′ long; leaves ovate-lanceolate in outline, 2 pinnate below, simply pinnate above, membranous, commonly drooping, 6′–2° long, 4′–12′ wide at the base; pinnules and upper pinnae wedge-obovate or rhomboid, rather long-stalked, glabrous, the upper margin rounded and more or less incised, crenate or dentate-serrate, except where it is recurved to form the indusia; main and secondary rachises and stalks of the pinnules black or dark brown like the stipe.

In ravines, Virginia to Florida, west to Missouri, Utah and California. Ascends to 1300 ft. in Kentucky. Also in tropical America, and widely distributed in the warmer parts of the Old World. June–Aug.

2. Adiantum pedàtum L. Maiden-hair Fern. (Fig. 60.)

Adiantum pedatum L. Sp. Pl. 1095. 1753.

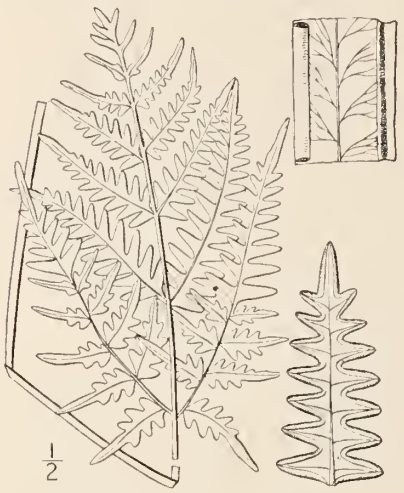
Rootstock slender, creeping, chaffy, rooting along its whole length. Stipes 9′–18′ long, dark chestnut-brown, polished and shining, dichotomously forked at the summit; leaves obliquely orbicular in outline, 8′–18′ broad, membranous, the pinnae arising from the upper sides of the two branches of the stipe, somewhat radiately arranged, the larger ones 6′–10′ long, 1′–2′ wide; pinnules oblong, triangular-oblong, or the terminal one fan-shaped, short-stalked, the lower margin entire and slightly curved, the upper margin cleft, lobed or dentate, bearing the linear-oblong, often short sori.

In woods, Nova Scotia to British Columbia, south to Georgia and Arkansas, in the Rocky Mountains to Utah and to California. Ascends to 5000 ft. in Virginia. Also in Alaska and western Asia. July–Sept.

12. PTÈRIS L. Sp. Pl. 1073. 1753.

Large, mostly coarse ferns, our species growing in sunny places, with variously divided or in some tropical species simple leaves, and marginal linear continuous sori which occupy a slender or filiform receptacle, connecting the tips of free veins. Indusium membranous, formed of the reflexed margin of the leaf. Sporanges pedicelled, provided with a vertical ring which bursts transversely. Stipes continuous with the rootstock. [Greek name for ferns, from the fancied resemblance of their leaves to the wings of birds.]

About 100 species of very wide geographic distribution, mostly of warm and tropical regions. Besides the following, three others occur in the southeastern United States.



1. Pteris aquilìna L. Brake. Bracken. (Fig. 61.)

Pteris aquilina L. Sp. Pl. 1075. 1753.

Rootstock stout, woody, horizontal, subterranean. Stipes 1°–2° long, straw colored or brownish; leaves 2°–4° long, 1°–3° wide, usually glabrous, ternate, the three branches each 2-pinnate; upper pinnules undivided, the lower more or less pinnatifid.

In dry or moist sunny places, distributed over nearly the whole of North America, except the extreme north, and over nearly the whole of the Old World. Ascends to 5000 ft. in North Carolina. Forms with pubescent lower leaf surfaces occur in southern New York and New Jersey. July–Sept.

Pteris aquilìna caudàta (L.) Hook. Sp. Fil. 2: 196. 1858.

Pteris caudata L. Sp. Pl. 1075. 1753.

Pinnules sometimes linear and entire, or with the segments less crowded and the terminal lobe attenuate, narrow and entire. In sandy soil, New York to Florida and Texas, and in tropical America.

13. CRYPTOGRÁMMA R. Br. App. Franklin's Journ. 767. 1823.

Light green, alpine and arctic ferns with leaves of two kinds, the segments of the sterile much broader than those of the fertile, the sporanges in oblong or roundish sori, which are at length confluent and cover the backs of the fertile pinnules. Indusium formed of the somewhat altered margin of the pinnule, at first reflexed to the midrib, so that the segments appear pod-like, at length opening out flat. Sporanges pedicelled, provided with a vertical ring which bursts transversely, borne at or near the ends of unconnected veins, copious, light brown. [Greek, in allusion to the hidden sporanges.]

Two species, the following of northern North America, the other of boreal regions of Old World.

1. Cryptogramma acrostichoìdes R. Br. American Rock-brake. (Fig. 62.)

Cryptogramma acrostichoides R. Br. App. Franklin's Journ. 767. 1823.

Allosorus acrostichoides Spreng. Syst. 4: 66. 1827.

Rootstock rather stout, short, chaffy. Stipes densely tufted, straw-colored, 2′–6′ long, chaffy below, very slender; leaves ovate or ovate-lanceolate in outline, thin, glabrous, 2–3-pinnate, the sterile shorter than the fertile, their ultimate segments and pinnules crowded, ovate, oblong or obovate, obtuse, crenate or slightly incised; fertile leaves with linear or linear-oblong segments 3″–6″ long, 1″ or less wide, the margins involute to the midrib at first, at maturity expanded and exposing the light brown sporanges.

Forming dense patches among rocks, Labrador and Hudson Bay to Alaska, south to Lakes Huron and Superior, in the Rocky Mountains to Colorado and to California. Summer.

14. PELLAÈA Link, Fil. Hort. Berol. 59. 1841.

Rock-loving small or medium-sized ferns with pinnate or pinnatifid leaves and intramarginal sori borne on the ends of unconnected veins, at length confluent and forming a marginal line. Indusium commonly broad and membranous, formed of the reflexed margins of fertile segments which are more or less modified and membranous. Fertile and sterile leaves similar. Stipes usually dark-colored. Sporanges provided with a vertical ring which bursts transversely, pedicelled, copious, usually dark brown. [Greek, in allusion to the dark-colored stipes.]

About 55 species, of wide geographic distribution. Besides the following, some 12 others occur in the western and southwestern parts of North America.

Texture of the leaves thin; veins plainly visible.	1. *P. Stelleri.*
Texture coriaceous; leaves evergreen; veins obscure.	
Leaves pinnate or 2-pinnate with large pinnules.	2. *P. atropurpurea.*
Leaves small, 3-pinnate, the pinnules narrow.	3. *P. densa.*

1. Pellaea Stélleri (S. G. Gmel.) Watt. Slender Cliff-brake. (Fig. 63.)

Pteris Stelleri S. G. Gmel. Nov. Com. Acad. Petrop. 12: 519. *pl. 12. f. 1.* 1768.
Pteris gracilis Michx. Fl. Bor. Am. 2: 262. 1803.
Pellaea gracilis Hook. Sp. Fil. 2: 138. 1858.
Pellaea Stelleri Watt, Can. Fil. No. 2. 1869-70.

Rootstock slender, creeping, thread-like, somewhat scaly. Stipes scattered, 2′–3′ long, straw-colored or pale brown, slightly chaffy below; leaves thin-membranous, ovate in outline, 2′–5′ long, 1′–2′ wide, 2–3-pinnate or pinnatifid above, the fertile taller than the sterile and with narrower pinnules and segments; pinnae lanceolate-deltoid, cut to the rachis into a few blunt or subacute slightly lobed or entire segments; indusium broad, continuous; veins of the fertile leaves mostly only one-forked, everywhere apparent and conspicuous.

On rocks, preferring limestone, Labrador to British Columbia, south to Massachusetts, Pennsylvania, Iowa, Wisconsin and in the Rocky Mountains to Colorado. Ascends to 2500 ft. in Vermont. Also in Asia. Aug.–Sept.

2. Pellaea atropurpùrea (L.) Link. Purple-stemmed Cliff-brake. (Fig. 64.)

Pteris atropurpurea L. Sp. Pl. 1076. 1753.
Pellaea atropurpurea Link, Fil. Hort. Berol. 59. 1841.

Rootstock short, densely clothed with rusty slender hair-like scales. Stipes tufted, 2′–6′ long, dark purple or nearly black; leaves coriaceous, lanceolate or ovate-lanceolate in outline, 4′–12′ long, 2′–6′ wide, simply pinnate or 2-pinnate below; rachis dark-brown or purple, glabrous or pubescent; pinnules and upper pinnae 1′–2′ long, glabrous, 3″ or less wide, short-stalked or sessile; indusium formed of the slightly altered incurved margin of the pinnules; veins obscure, commonly twice forked.

On rocks, preferring limestone, Ontario to the Northwest Territory and British Columbia, south to New Jersey, Georgia, the Indian Territory, Arizona and northern Mexico. Ascends to 2200 ft. in Virginia. June–Sept.

3. Pellaea dénsa (Brack.) Hook. Oregon Cliff-brake. (Fig. 65.)

Onychium densum Brack. Fil. U. S. Expl. Exp. 120. 1854.

Pellaea densa Hook. Sp. Fil. 2: 150. 1858.

Rootstock rather slender, chaffy with blackish scales. Stipes densely tufted, wiry, slender, light brown, 3′–9′ long; leaves ovate or triangular-oblong in outline, 1′–3′ long, densely 3-pinnate, the segments 3″–6″ long, linear, nearly sessile, acuminate or mucronate, those of the fertile leaves tapering at each end, with narrowly recurved margins; apices of the rare sterile leaves sharply serrate, these otherwise similar to the fertile ones.

Mt. Albert, Gaspé, Quebec. Also from British Columbia to Wyoming and California. Summer.

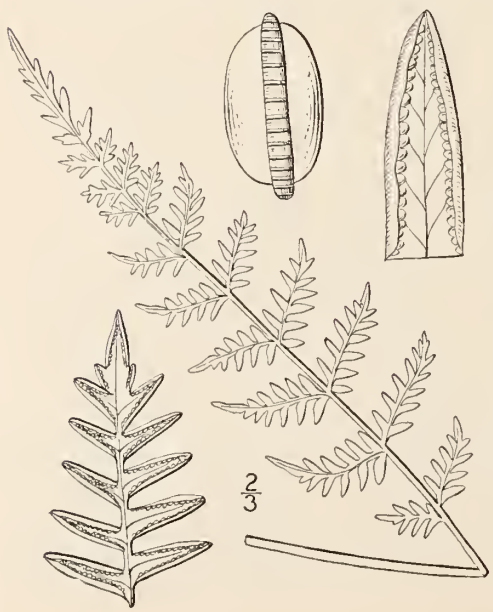
15. CHEILÁNTHES Sw. Syn. Fil. 126. 1806.

Mostly pubescent or tomentose rock-loving and small ferns with much divided leaves, the sori terminal on the veins, at first small, ultimately more or less confluent. Indusium formed of the reflexed margin of the leaf, roundish and distinct or more or less confluent. Sporanges pedicelled, provided with an elastic ring which bursts transversely, often much concealed in the scales or tomentum which covers the segments in many species. [Greek, in allusion to the lipped indusia of some species.]

About 65 species, of temperate and tropical regions. Besides the following, some 14 others occur in the western and southwestern parts of North America and one in Florida.

Leaves nearly glabrous, 2-pinnate.	1. *C. Alabamensis.*
Leaves hirsute and glandular, not tomentose; indusia not continuous.	2. *C. lanosa.*
Leaves more or less tomentose; indusia mostly continuous.	
Leaves 2′–5′ long; stipes slender, at length nearly glabrous.	3. *C. gracilis.*
Leaves 6′–15′ long; stipes stout, densely brown-tomentose.	4. *C. tomentosa.*

1. Cheilanthes Alabaménsis (Buckl.) Kunze. Alabama Lip-fern. (Fig. 66.)



Pteris Alabamensis Buckl. Amer. Journ. Sci. 45: 177. 1843.

Cheilanthes Alabamensis Kunze, Linnaea, 20: 4. 1847.

Rootstock creeping, rather stout and short, clothed with slender brown scales. Stipes black, 3′–7′ long, slender, wiry, villous at least towards the base with rusty wool; leaves lanceolate in outline, glabrous, 2′–10′ long, 2-pinnate; pinnae numerous, ovate-lanceolate, acuminate, very short-stalked, the lowest usually smaller than those above; pinnules oblong or triangular-oblong, mostly acute, often auriculate on the upper side at the base, more or less toothed or incised; indusia pale, membranous, interrupted by the incising of the pinnae.

On rocks, Virginia to Alabama, west to Illinois, Arkansas and Arizona. Aug.–Oct.

2. Cheilanthes lanòsa (Michx.) Watt. Hairy Lip-fern. (Fig. 67.)

Nephrodium lanosum Michx. Fl. Bor. Am. 2: 270. 1803.
Cheilanthes vestita Sw. Syn. Fil. 128. 1806.
Cheilanthes lanosa Watt, Trimen's Journ. Bot. 12: 48. 1874.

Rootstock short, creeping, covered with pale rusty-brown scales. Stipes tufted, wiry, chestnut-brown, 2′–4′ long, hirsute; leaves herbaceous, oblong-lanceolate in outline, 4′–9′ long, 1′–2′ wide, gradually attenuate to the apex, 2-pinnate; piunules somewhat distant, lanceolate-deltoid, acute, deeply pinnatifid or incised, more or less covered with almost bristly hairs and usually somewhat glandular, obtuse or subacute; sori numerous, covered by the iufolded ends of the rounded or oblong lobes.

On rocks, southern New York to Georgia, west to Missouri, Arkansas and Texas. Ascends to 1900 ft. in North Carolina. July–Sept.

3. Cheilanthes grácilis (Fée) Mett. Slender Lip-fern. (Fig. 68.)

Myriopteris gracilis Fée, Gen. Fil. 150. 1850–52.
Cheilanthes lanuginosa Nutt.; Hook. Sp. Fil. 2: 99. 1858.
Cheilanthes gracilis Mett. Abh. Senck. Nat. Gesell. 3: [reprint 36]. 1859.

Rootstock short, covered with narrow brown scales lined with black. Stipes densely tufted, slender, about as long as the leaves, at first covered with woolly hairs, at length nearly glabrous; leaves ovate-lanceolate iu outline, 2′–4′ long, 1′–2′ wide, 3-piunate or 2-pinnate with the piunules pinnatifid, the upper surface slightly tomentose, the lower densely matted with whitish-browu woolly hairs; upper pinnae oblong-ovate, the lower deltoid, the lowest distaut; ultimate segments or lobes minute, the terminal ones slightly larger than the others, all roundish or obovate and much crowded; indusium narrow, formed of the iurolled unchauged margin of the segments.

On rocks, Illinois and Minnesota to British Columbia, south to Texas and Arizona. July–Oct.

4. Cheilanthes tomentòsa Link. Woolly Lip-fern. (Fig. 69.)

Cheilanthes tomentosa Link, Hort. Berol. 2: 42. 1833.

Rootstock stout, short, densely chaffy with slender light brown scales. Stipes tufted, 4′–8′ long, rather stout, densely brown-tomentose even wheu mature; leaves oblong-lanceolate iu outline, 3-pinnate, 6′–18′ long, densely tomentose, especially beneath, with slender brownish-white obscurely articulated hairs; piunae and pinnules ovate-oblong or oblong-lanceolate, the ultimate pinnules about ½″ long, the terminal ones sometimes twice as large as the others; iudusia pale, membranous, continuous.

On rocks, Virginia to Georgia, west to Missouri, Texas, Arizona and Mexico. Ascends to 1900 ft. in North Carolina. July–Oct.

16. NOTHOLAÈNA R. Br. Prodr. Fl. Nov. Holl. 1: 145. 1810.

Mostly small rock-loving ferns, with 1–3-pinnate or pinnatifid leaves and marginal roundish or oblong sori, which are at first distinct but soon confluent into a narrow band. Indusium none, but the sporanges are sometimes at first covered by the inflexed margin of the leaf. Veins free. Sporanges pedicelled, provided with a vertical transversely bursting ring. Lower surface of the leaf often covered with a white or yellow waxy powder, or in some species with a dense tomentum. [Greek, in allusion to the woolly lower surfaces.]

About 40 species, of wide distribution, most numerous in America. Besides the following, some 13 others are found in the mountainous portions of the southwestern United States.

1. Notholaena nívea dealbàta (Pursh) Davenp. Powdery Notholaena. (Fig. 70.)

Cheilanthes dealbata Pursh, Fl. Am. Sept. 671. 1814.
Notholaena dealbata Kunze, Amer. Journ. Sci. (II.) 6: 82. 1848.
Notholaena nivea var. *dealbata* Davenp. Cat. Davenp. Herb. Suppl. 44. 1883.

Rootstock short, chaffy with narrow brown scales. Stipes tufted, wiry, very slender, shining, dark brown, 1′–3′ long; leaves triangular-ovate in outline, acute, broadest at the base, 1′–4′ long, 3–4-pinnate, the rachis black and shining; pinnae ovate, the lower slender-stalked; ultimate pinnules ovate or obovate, obtuse, lobed, crenate or entire, small, scarcely 1″ long, white and powdery on the lower surface.

On calcareous rocks, Missouri and Kansas to Arizona and Texas. June–Sept. The typical form of the species occurs in the Southwestern States and in Central America.

17. POLYPÒDIUM L. Sp. Pl. 1082. 1753.

Pinnate or simple ferns with stipes articulated to the creeping rootstocks. Sori circular, dorsal, in one or more rows on either side of the midribs. Indusium none. Sporanges pedicelled, provided with a vertical ring which bursts transversely. Veins variously arranged. [Greek, in allusion to the branched rootstocks of some species.]

About 350 species, of very wide geographic distribution, mostly of tropical regions. Besides the following, 5 occur in Florida, 1 in Arizona and 3 on the Pacific Coast.

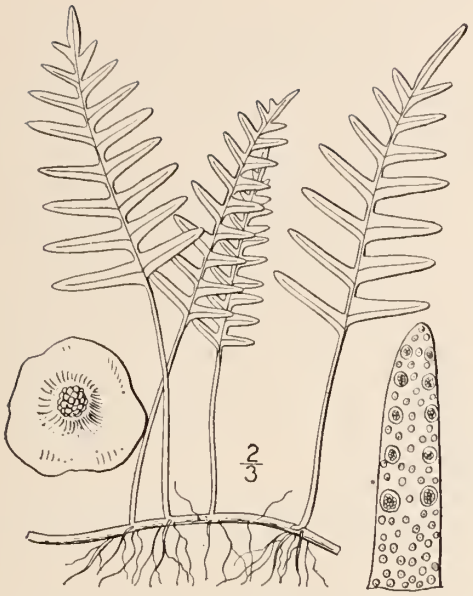
Lower surface of the leaf glabrous; plant green. 1. *P. vulgare.*
Lower surface of the leaf densely scaly; plant grayish. 2. *P. polypodioides.*

1. Polypodium vulgàre L. Common Polypody. (Fig. 71.)

Polypodium vulgare L. Sp. Pl. 1085. 1753.

Rootstock slender, widely creeping, densely covered with cinnamon-colored scales. Stipes light colored, glabrous, 2′–6′ long; leaves ovate-oblong or narrowly oblong in outline, subcoriaceous, evergreen, glabrous on both surfaces, 3′–10′ long, 1′–3′ wide, cut nearly to the rachis into entire or slightly toothed, obtuse or subacute, linear or linear-oblong segments; sori large, borne about midway between the midrib and margins of the segments; veins free.

On rocks or rocky banks, almost throughout North America, Asia and Europe. Ascends to 5600 ft. in Virginia. The leaf varies much in serration. Forms with the ends of the segments enlarged, somewhat palmately lobed, and the upper crested are known as var. *cristatum*. Forms with the segments broad and deeply pinnatifid are called var. *Cambricum*. Summer.



2. Polypodium polypodioides (L.) A. S. Hitchcock.
Gray Polypody. (Fig. 72.)

Acrostichum polypodioides L. Sp. Pl. 1068. 1753.
Polypodium incanum Sw. Fl. Ind. Occ. **3**: 1645. 1806.
Polypodium polypodioides A. S. Hitchcock, Rep. Mo. Bot. Gard. **4**: 156. 1893.

Rootstock widely creeping, woody, covered with small brown scales. Stipes densely scaly, 1′–3′ long; leaves oblong-lanceolate in outline, acute, coriaceous, evergreen, 1′–6′ long, 1′–1½′ wide, cut very nearly or quite to the rachis into entire oblong or linear-oblong obtuse segments, glabrous or nearly so on the upper surface, the lower densely covered with gray peltate scales with darker centres, as are also the rachises; veins indistinct, unconnected and usually once forked.

On trees or rarely on rocks, Virginia to Florida, west to Illinois, Missouri and Texas. Ascends to 4000 ft. in North Carolina. Widely distributed in tropical America. July–Sept.

Family 6. **MARSILEÀCEAE** R. Br. Prodr. Fl. Nov. Holl. **1**: 166. 1810.

Perennial herbaceous plants rooting in mud, with slender creeping rootstocks and 4-foliolate or filiform leaves. Asexual propagation consisting of sporocarps borne on peduncles which rise from the rootstock near the leaf-stalk or are consolidated with it, containing both macrospores and microspores. The macrospores germinate into prothallia which bear mostly archegonia, while the microspores grow into prothallia bearing the antheridia.

Two genera and some 45 species of wide geographic distribution.

1. MARSÍLEA L. Sp. Pl. 1099. 1753.

Marsh or aquatic plants, the leaves commonly floating on the surface of shallow water, slender-petioled, 4-foliolate, Peduncles shorter than the petioles, arising from their bases or more or less adnate to them. Sporocarps ovoid or bean-shaped, composed of two vertical valves with several transverse compartments (sori) in each valve. [Name in honor of Giovanni Marsigli, an Italian botanist, who died about 1804.]

About 40 species, widely distributed. Besides the following 2 or 3 others occur in Texas.

Sporocarps glabrous and purple when mature. 1. *M. quadrifolia.*
Sporocarps densely covered with hair-like scales. 2. *M. vestita.*

1. Marsilea quadrifòlia L.
European Marsilea. (Fig. 73.)

Marsilea quadrifolia L. Sp. Pl. 1099. 1753.

Rootstock slender, buried in the muddy bottoms of shallow lakes or streams. Petioles usually slender, 2′–5′ high, or when submerged sometimes elongated to 1° or 2°. Leaflets mostly triangular-obovate, variable in outline, 3″–8″ long, 2″–6″ wide, glabrous or rarely with scattered hairs when young, the margins entire; sporocarps 2 or rarely 3 on a branching peduncle which is attached to the petiole at its base, covered with short yellowish-brown hairs when young, becoming glabrous and dark purple when mature; sori 8 or 9 in each valve.

Along the shores of Bantam Lake, Litchfield Co., Conn., whence it has been introduced into various parts of the country, notably into eastern Massachusetts. Native of Europe and Asia.

2. Marsilea vestìta Hook. & Grev. Hairy Marsilea. (Fig. 74.)

Marsilea vestita Hook. & Grev. Ic. Fil. *pl. 159.* 1831.
Marsilea mucronata A. Br. Amer. Journ. Sci. (II.) 3: 55. 1847.

Rootstock slender, creeping. Petioles slender, 2′–5′ high; leaflets similar to those of the preceding species, entire or toothed; sporocarps 2″–4″ long, 2″–3″ wide, with a short raphe, a short and blunt lower tooth and an acute and sometimes curved upper one, densely covered with soft spreading narrow hair-like scales or (in the forms known as *M. mucronata*) these short and appressed or almost wanting; sori 6–11 in each valve.

In wet sand or in shallow ditches, Florida to Kansas, Arizona and Mexico, north to British Columbia.

Family 7. SALVINIÀCEAE Reichenb. Consp. 30. 1828.

Salvinia Family.

Small floating plants with a more or less elongated and sometimes branching axis bearing apparently 2-ranked leaves. Sporocarps soft, thin-walled, borne 2 or more on a common stalk, 1-celled, with a central often branched receptacle, which bears macrosporanges containing a single macrospore or microsporanges containing numerous microspores. The macrospores germinate into prothallia which bear archegones, the microspores into prothallia which bear antherids.

The family consists of two genera.

Leaves 6″–9″ long, 2-ranked, on mostly simple stems. 1. *Salvinia*.
Leaves minute, closely imbricated on pinnately branching stems. 2. *Azolla*.

1. SALVÍNIA Adans. Fam. Pl. 2: 15. 1763.

Floating annual plants with slender stems bearing rather broad 2-ranked leaves. Sporocarps globose, depressed, 9–14-sulcate, membranous, arranged in clusters, 1 or 2 of each cluster containing 10 or more sessile macrosporanges, each containing few macrospores, the others containing numerous smaller globose pedicelled microsporanges with very numerous microspores. Leaves rather dark green, finely papillose on the upper surface. [Name in honor of Antonio Maria Salvini, 1633–1729, Italian scientist.]

About 13 species of wide distribution. Only the following occurs in North America.

1. Salvinia nàtans (L.) Hoffm. Salvinia. (Fig. 75.)

Marsilea natans L. Sp. Pl. 1099. 1753.
Salvinia natans Hoffm. Deutsch. Fl. 2: 1. 1795.

Leaves oblong, rather thick, obtuse or emarginate at the apex, rounded or cordate at the base, entire, spreading, 6′–12′ long, pinnately veined, bright green and papillose above, the lower surface densely matted with brown pellucid hairs; sporocarps 4–8 in a cluster, the upper ones containing about 10 macrosporanges, each containing a few macrospores, the remainder containing numerous microsporanges each with numerous microspores; macrospores marked with 3 obtuse lobes which meet at the apex.

Bois Brulé Bottoms, Perry Co., Missouri and near Minneapolis, Minn. Introduced into ponds on Staten Island, N. Y. Reported by Pursh in 1814 from central New York, but his exact station is unknown. Widely distributed in Europe and Asia.

2. AZÓLLA Lam. Encycl. 1: 343. 1783.

Minute moss-like reddish or green floating plants, with pinnately branched stems covered with minute imbricated 2-lobed leaves, and emitting rootlets beneath. Sporocarps of two kinds borne in the axils of the leaves, the smaller ovoid or acorn-shaped, containing a single macrospore at the base and a few corpuscles above it whose character is not fully known, the larger globose, producing many pedicelled sporanges, each containing several masses of microspores which are often beset with a series of anchor-like processes of unknown function. [Greek, signifying killed by drought.]

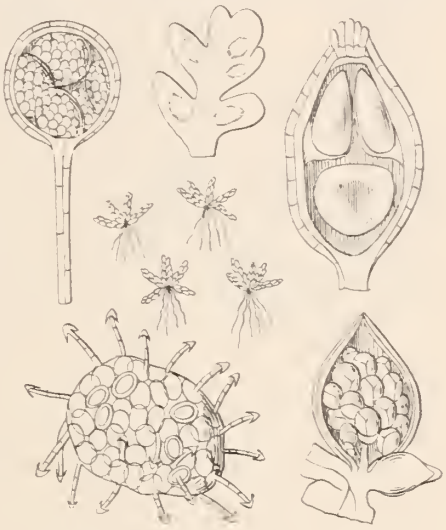
About 5 species of wide geographic distribution.

1. Azolla Caroliniàna Willd. Carolina Azolla. (Fig. 76.)

Azolla Caroliniana Willd. Sp. Pl. 5: 541. 1810.

Plants greenish or reddish, deltoid or triangular-ovate in outline, pinnately branching, sometimes covering large surfaces of water. Macrospores minutely granulate, with three accessory corpuscles; masses of microspores armed with rigid septate processes; leaves with ovate lobes, their color varying somewhat with the amount of direct sunlight, the lower usually reddish, the upper green with a reddish border.

Floating on still water, Ontario and western New York to British Columbia, south to Florida, Arizona and Mexico. Also in South America. Naturalized in lakes on Staten Island, N. Y.



Family 8. EQUISETÀCEAE Michx. Fl. Bor. Am. 2: 281. 1803.

HORSETAIL FAMILY.

Rush-like perennial plants, with mostly hollow jointed simple or often much-branched grooved stems, provided with a double series of cavities and usually with a large central one, the branches verticillate, the nodes provided with diaphragms. Rootstocks subterranean. Leaves reduced to sheaths at the joints, the sheaths toothed. Sporanges 1-celled, clustered underneath the scales of terminal cone-like spikes. Spores all of the same size and shape, furnished with 2 narrow strap-like appendages attached at the middle, coiling around the spore when moist and spreading, when dry and mature, in the form of a cross (elaters). Epidermis impregnated with silica, rough. Prothallium on the surface of the ground, green, usually dioecious.

The family consists of the following genus:

1. EQUISÈTUM L. Sp. Pl. 1061. 1753.

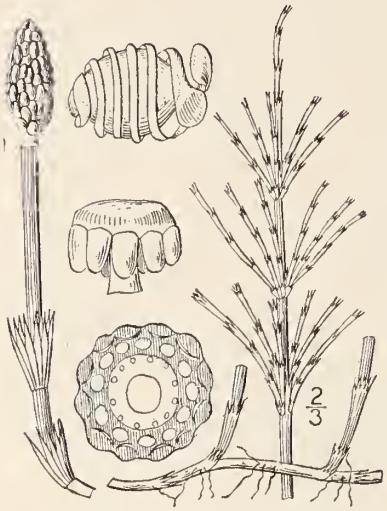
Characters of the family. [Name ancient, signifying horse-tail, in allusion to the copious branching of several species.]

About 25 species, of very wide geographic distribution.

Stems annual; stomata scattered.
- Stems of two kinds, the fertile appearing in early spring before the sterile.
  - Fertile stems simple, soon withering; sheaths of branches of sterile stems 4-toothed. 1. *E. arvense.*
  - Fertile stems branched when old, only the apex withering.
    - Branches of the stem simple, their sheaths 3-toothed. 2. *E. pratense.*
    - Branches compound. 3. *E. sylvaticum.*
- Stems all alike; spores mature in summer; branches simple or none.
  - Sheaths rather loose; branches usually long; stems bushy below, attenuate upwards.
    - Central cavity very small; spike long. 4. *E. palustre.*
    - Central cavity about one-half the diameter of stem; spike short. 5. *E. littorale.*
  - Sheaths appressed; branches usually short. 6. *E. fluviatile.*

Stems perennial, evergreen; spikes tipped with a rigid point; stomata in regular rows.
- Stems tall, usually many-grooved.
  - Stems rough and tuberculate, prominently ridged.
    - Ridges with 1 line of tubercles; ridges of sheath tricarinate; stem stout. 7. *E. robustum.*
    - Ridges of the stem with 2 indistinct lines of tubercles; ridges of sheath obscurely 4-carinate; stem slender. 8. *E. hyemale.*
  - Stems not tuberculate; sheaths enlarged upward. 9. *E. laevigatum.*
- Stems low, slender, tufted, usually 5–10-grooved.
  - Central cavity small; sheaths 5–10-toothed. 10. *E. variegatum.*
  - Central cavity none; sheaths 3-toothed. 11. *E. scirpoides.*

1. Equisetum arvénse L. Field Horsetail. (Fig. 77.)

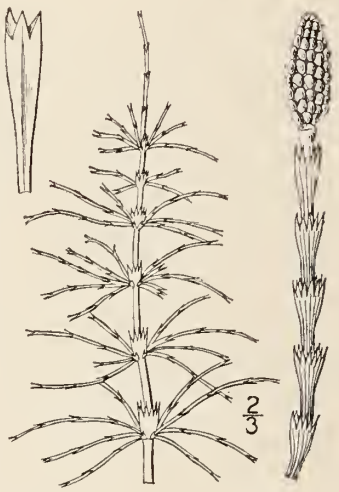


Equisetum arvense L. Sp. Pl. 1061. 1753.

Stems annual, provided with scattered stomata, the fertile appearing in early spring before the sterile. Fertile stems 4′–10′ high, not branched, soon withering, light brown, their loose scarious sheaths mostly distant, whitish, ending in about 12 brown acuminate teeth; sterile stems green, rather slender, 2′–2° high, 6–19-furrowed, with numerous long mostly simple verticillate 4-angled or rarely 3-angled solid branches, the sheaths of the branches 4-toothed, the stomata in 2 rows in the furrows; central cavity one-fifth to one-fourth the diameter of the stem.

In sandy soil, especially along roadsides and railways, Newfoundland and Greenland to Alaska, south to Virginia and California. Also in Europe and Asia. Ascends to at least 2500 ft in Virginia. An occasional form in which the sterile stem bears a terminal spike is known as var. *serotinum*. Sterile stems sometimes very short and with long prostrate or ascending branches. May.

2. Equisetum praténse Ehrh. Thicket Horsetail. (Fig. 78.)



Equisetum pratense Ehrh. Hanov. Mag. 138. 1784.

Stems annual, 8′–16′ high, with scattered stomata, the fertile appearing in spring before the sterile, branched when old, only its apex withering, the two becoming similar in age; stems rough, 8–20-ridged with narrow furrows and cylindric or cup-shaped sheaths; branches straight, rather short, simple, densely whorled, 3-angled or rarely 4–5-angled, solid; sheaths of the stem with about 11 short ovate-lanceolate teeth, those of the branches 3-toothed; rootstocks solid, acutely angled.

In sandy places, Nova Scotia and Rupert River to Minnesota, and Alaska, south to New Jersey and Colorado. Also in Europe and Asia. July–Sept.

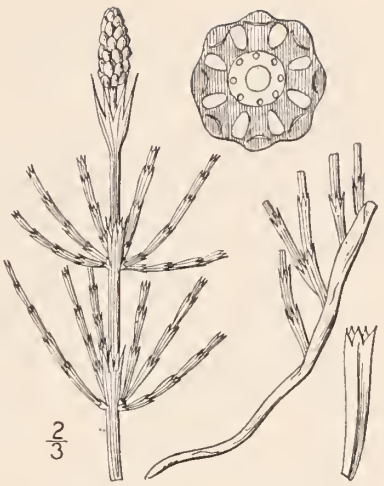
3. Equisetum sylváticum L. Wood Horsetail. (Fig. 79.)

Equisetum sylvaticum L. Sp. Pl. 1061. 1753.

Stems annual, provided with scattered stomata, the fertile appearing in early spring before the sterile, at first simple, at length much branched and resembling the sterile, only its naked apex withering. Stems usually 12-furrowed, producing verticillate compound branches, the branchlets curved downward; sheaths loose, cylindric or campanulate, those of the stem with 8–14 bluntish teeth, those of the branches with 4 or 5 teeth, those of the branchlets with 3 divergent teeth; central cavity nearly one-half the diameter of the stem; branches and branchlets solid.

In moist sandy woods and thickets, Newfoundland and Greenland to Alaska, south to Virginia and Michigan. Also in Europe and Asia. May.

4. Equisetum palústre L. Marsh Horsetail. (Fig. 80.)

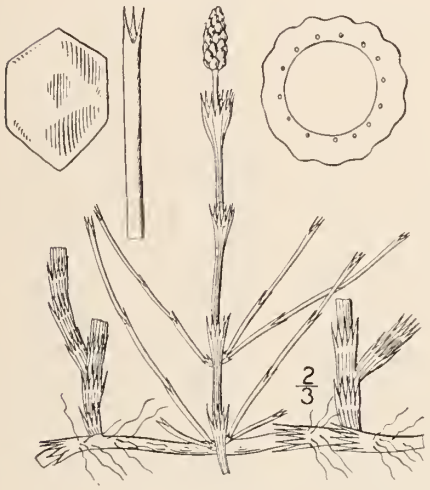


Equisetum palustre L. Sp. Pl. 1061. 1753.

Stems annual, slender, all alike, 10′–18′ long, very deeply 5–9-grooved, the grooves separated by narrow roughish wing-like ridges, the central canal very small; sheaths rather loose, bearing about 8 subulate-lanceolate whitish-margined teeth; branches simple, few in the whorls, 4–7-angled, always hollow, barely sulcate, more abundant below than above, their sheaths mostly 5-toothed; spike rather long; stomata abundant in the furrows.

In wet places, Nova Scotia to Alaska, south to Maine, western New York, Minnesota and Arizona. Also in Europe. July–Aug.

5. Equisetum littoràle Kuehl. Shore Horsetail. (Fig. 81.)

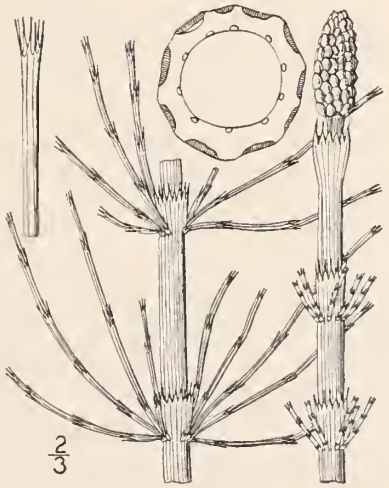


Equisetum littorale Kuehl. Beitr. Pflanz. Russ. Reichs, 4: 91. 1845.

Stems annual, very slender, all alike, 8′–18′ high, slightly roughened, 6–19-grooved, the ridges rounded, the central canal one-half to two-thirds the diameter; sheaths sensibly dilated above, the uppermost inversely campanulate, their teeth herbaceous, membranous at the margins, narrow, lanceolate; branches of two kinds, simple, some 4-angled and hollow, some 3-angled and solid, the first joint shorter or a trifle longer than the sheath of the stem; spike short with abortive spores, these commonly with no elaters.

On sandy river and lake shores, Maine and Ontario to New Jersey and Pennsylvania, west to British Columbia. Also in Europe. Supposed to be a hybrid. Aug.–Sept.

6. Equisetum fluviátile L. Swamp Horsetail. (Fig. 82.)



Equisetum fluviatile L. Sp. Pl. 1062. 1753.

Equisetum limosum L. Sp. Pl. 1062. 1753.

Stems annual, all alike, 2°–4° high, slightly 10–30-furrowed, very smooth, usually producing upright branches after the spores are formed, the stomata scattered. Sheaths appressed with about 18 dark brown short acute rigid teeth, air cavities wanting under the grooves, small under the ridges; central cavity very large; branches hollow, slender, smaller but otherwise much like the stems, short or elongated; rootstocks hollow.

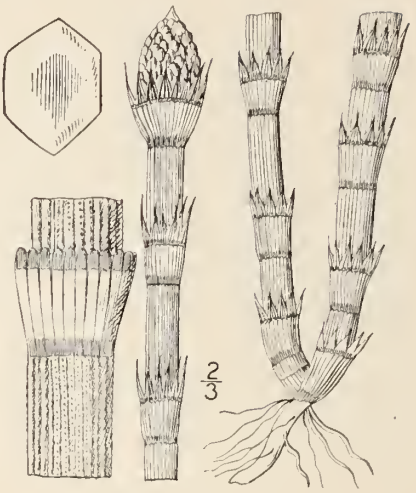
In swamps and along the borders of ponds, Nova Scotia to Alaska, south to Virginia, Nebraska and Washington. Also in Europe and Asia. May–June.

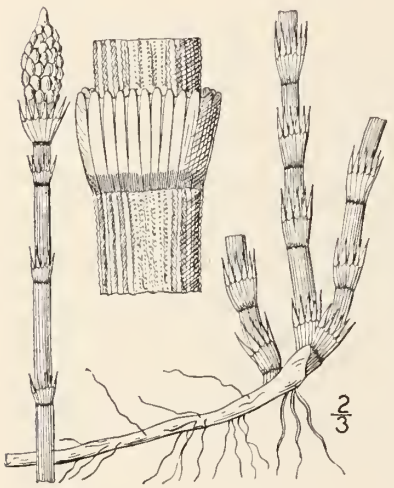
7. Equisetum robústum A. Br. Stout Scouring-rush. (Fig. 83.)

Equisetum robustum A. Br.; Engelm. Amer. Journ. Sci. 46: 88. 1844.

Stems perennial, stout, tall, evergreen, 3°–11° high, sometimes nearly 1′ in diameter, 20–48-furrowed, simple or little branched. Ridges of the stem roughened with a single series of transversely oblong siliceous tubercles; sheaths short, cylindric, appressed, marked with black girdles at the base, and at the bases of the dark caducous teeth; ridges of the sheath 3-carinate; branches when present occasionally fertile; spikes tipped with a rigid point.

In wet places, Ohio to Louisiana and Mexico, west to British Columbia and California. Also in Asia. May–June.





8. Equisetum hyemàle L. Common Scouring-rush. (Fig. 84.)

Equisetum hyemale L. Sp. Pl. 1062. 1753.

Stems slender, rather stiff, evergreen, 2°–4° high, with the stomata arranged in regular rows, rough, 8–34-furrowed, the ridges with two indistinct lines of tubercles, the central cavity large, from one-half to two-thirds the diameter; sheaths rather long, cylindric, marked with one or two black girdles, their ridges obscurely 4-carinate; teeth brown, membranous, soon deciduous; spikes pointed; stem rarely producing branches which are usually short and occasionally fertile; forms are sometimes found with longer sterile branches.

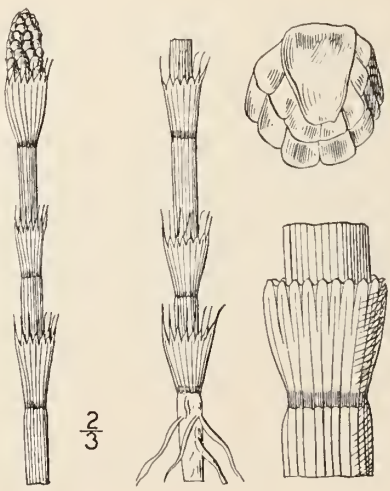
In wet places and on banks, especially along rivers and lakes, throughout nearly the whole of North America, Europe and Asia. The rough stems of this and related species are used for scouring floors. May–June.

9. Equisetum laevigàtum A. Br. Smooth Scouring-rush. (Fig. 85.)

Equisetum laevigatum A. Br.; Engelm. Amer. Journ. Sci. 46: 87. 1844.

Stems 1°–5° high, simple or little branched, pale green, persistent, 14–30-furrowed, the ridges almost smooth. Sheaths elongated and enlarged upward, marked with a black girdle at the base of the mostly deciduous, white-margined teeth and rarely also at their bases; ridges of the sheath with a faint central carina and sometimes with faint short lateral ones; stomata arranged in single series; central cavity very large, the wall of the stem very thin; spikes pointed.

Along streams and rivers, especially in clay soil, valley of the Delaware River in New Jersey and eastern Pennsylvania to North Carolina and Louisiana, west to British Columbia and the Mexican border. May–June.

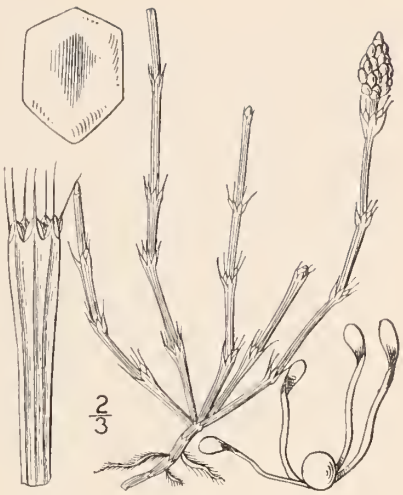


10. Equisetum variegàtum Schleich. Variegated Equisetum. (Fig. 86.)

Equisetum variegatum Schleich. Cat. Pl. Helvet. 27. 1807.

Stems slender, perennial, evergreen, 6′–18′ long, rough, usually simple from a branched base, commonly tufted, 5–10-furrowed, the stomata borne in regular rows. Sheaths campanulate, distinctly 4-carinate, green, variegated with black above, the median furrow deep and excurrent to the teeth and downward to the ridges of the stem, the teeth 5–10, each tipped with a deciduous bristle; central cavity small, rarely wanting.

Labrador and Greenland to the Northwest Territory, south to New Hampshire, western New York, Nebraska and Nevada. Also in Europe and Asia. May–June.



11. Equisetum scirpoìdes Michx. Sedge-like Equisetum. (Fig. 87.)

Equisetum scirpoides Michx. Fl. Bor. Am. 2: 281. 1803.

Stems perennial, evergreen, very slender or filiform, 3′–6′ long, somewhat rough, flexuous and curving, growing in slender tufts, mostly 6-furrowed with acute ridges, simple or branching from near the base. Sheaths 3-toothed, distinctly 4-carinate, the central furrow broad, the lateral narrow, the bristly teeth rather persistent; central cavity entirely wanting.

On moist or wet wooded banks, Labrador to Alaska, south to Pennsylvania, Illinois and British Columbia. Also in Europe and Asia. May–June.

Family 9. LYCOPODIÀCEAE Michx. Fl. Bor. Am. 2: 281. 1803.

Club-moss Family.

Somewhat moss-like, erect or trailing terrestrial herbs with numerous small lanceolate or subulate simple leaves, sometimes oblong or roundish, arranged in 2–many ranks, the stems often elongated, usually freely branching. Sporanges 1–3-celled, solitary in the axils of the leaves or on their upper surfaces. Spores uniform, minute. Prothallia (as far as known) mostly subterranean, with or without chlorophyll, monoecious.

Four genera and about 110 species. Besides the following, *Psilotum* occurs in Florida, the two other genera only in Australia.

1. LYCOPÒDIUM L. Sp. Pl. 1100. 1753.

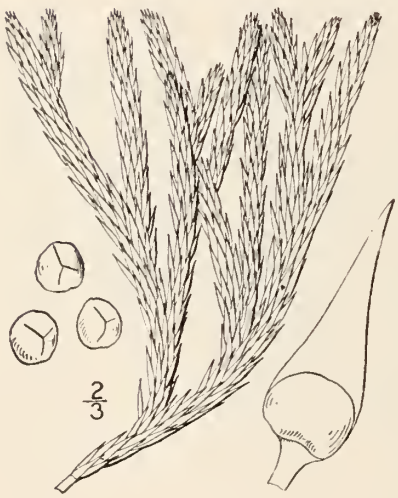
Perennial plants with evergreen 1-nerved leaves arranged in 4–16 ranks. Sporanges coriaceous, flattened, reniform, 1-celled, situated in the axils of ordinary leaves or in those of the upper modified, bract-like ones, which are imbricated in sessile or peduncled spikes, opening transversely into 2 valves, usually by a line around the margin. Spores all of one kind, copious, sulphur-yellow, readily inflammable from the abundant oil they contain. [Greek, meaning wolf's-foot, perhaps in allusion to the branching roots of some species.]

About 100 species of wide geographic distribution, the largest occurring in the Andes of South America and in the Himalayas.

Sporanges borne in the axils of leaves which are similar to those of the stem.
- Sporanges mostly wanting in the axils of the upper, mostly 8-ranked leaves.
  - Stems erect, rigid; leaves uniform, ascending. 1. *L. Selago.*
  - Stems somewhat lax, spreading; leaves spreading or deflexed, alternately longer and shorter. 2. *L. lucidulum.*
- Sporanges only in the axils of the upper leaves forming terminal spikes; leaves many-ranked.
  - Plant small; leaves acute, soft, mostly entire. 3. *L. inundatum.*
  - Plant stout; leaves narrow, spinulose-pointed, bristle-toothed below the middle. 4. *L. alopecuroides.*

Sporanges borne in the axils of yellowish ovate or cordate scale-like leaves, which are very unlike those of the sterile stems.
- Stems leafy up to the base of the spike or nearly so.
  - Spikes erect, closely sessile.
    - Stems erect, tree-like. 5. *L. obscurum.*
    - Stems creeping with ascending branches.
      - Leaves uniform, spreading, 5-ranked. 6. *L. annotinum.*
      - Leaves of 2 forms, erect-imbricate, 4-ranked. 7. *L. alpinum.*
  - Spikes erect, short-peduncled; leaves small, appressed, 4-ranked. 8. *L. sabinaefolium.*
- Fertile branches with minute leaves so that the spikes appear long-peduncled.
  - Leaves uniform, many-ranked; stems terete. 9. *L. clavatum.*
  - Leaves of 2 forms, few-ranked; stems flattened.
    - Sterile stems entirely creeping; spikes solitary. 10. *L. Carolinianum.*
    - Sterile stems with fan-like ascending branches; spikes clustered. 11. *L. complanatum.*

1. Lycopodium Selàgo L. Fir Club-moss. (Fig. 88.)



Lycopodium Selago L. Sp. Pl. 1102. 1753.

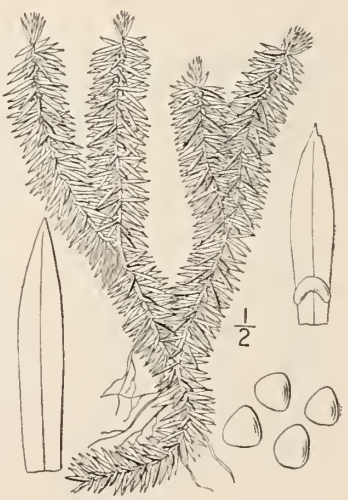
Stems 3′–6′ high, thick, rigid, erect, 2–5 times forked, the branches fastigiate, forming a level-topped cluster. Leaves crowded, uniform, ascending, elongated-lanceolate, mucronulate, entire or spinulose-denticulate, nerved below, convex above, the upper mostly 8-ranked, sterile, those below bearing the small sporanges in their axils, those of the lower half of the stem again sterile; plant propagated also by bud-like organs which have a lower pointed bract and 2 or 3 upper fleshy and obovate ones.

On rocks, Labrador and Greenland to Alaska, south to the mountains of Maine, New Hampshire, Vermont and northern New York, on the summits of the higher Alleghenies to North Carolina, and to Michigan and Washington. Also in Europe and Asia. Autumn.

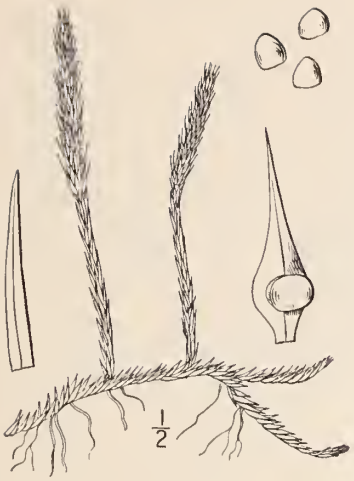
2. Lycopodium lucídulum Michx. Shining Club-moss. (Fig. 89.)

Lycopodium lucidulum Michx. Fl. Bor. Am. 2: 284. 1803.

Stems somewhat lax, ascending or spreading, thick, 2–3 times forked, the branches 6′–12′ high. Leaves widely spreading or reflexed, dark green, shining, 1-nerved, acute, minutely toothed, a series of longer ones alternating with a series of shorter, the latter more frequently bearing the sporanges at a short distance below the summit of the stem; sporanges of preceding years often persistent; plant also propagated like the preceding species by gemmae, which fall to the ground and become new plants.



In cold, damp woods, Newfoundland to British Columbia, south to North Carolina and Iowa. Ascends to nearly 5700 ft. in Virginia. Aug.-Oct.



3. Lycopodium inundàtum L. Bog Club-moss. (Fig. 90.)

Lycopodium inundatum L. Sp. Pl. 1102. 1753.

Plants small, 1′–5′ long, with creeping flaccid forking brittle sterile stems closely appressed to the earth. Fertile stems erect, solitary, 1′–6′ high, terminated by a short thick spike; leaves lanceolate or lanceolate-subulate with hyaline margins, those of the spike similar to those below, acute, soft, spreading, mostly entire, those of the sterile stems curved upward; spikes rarely two together, 9″–18″ long, yellowish; sporanges tranversely oval, splitting nearly to the base; spores large, reticulated.

In sandy bogs, Newfoundland to western Ontario and Michigan, south to Florida. Ascends to 2000 ft. in eastern Pennsylvania. Also in Europe and Asia. Larger forms with fertile stems 5′–7′ high and more pointed serrate leaves have been separated as var. *Bigelovii*. Aug.–Oct.

4. Lycopodium alopecuroìdes L. Fox-tail Club-moss. (Fig. 91.)

Lycopodium alopecuroides L. Sp. Pl. 1102. 1753.

Plant stout, densely leafy, the sterile branches flaccid, recurved and creeping, sometimes 10′ long. Fertile stems stout, rigid, erect, 6′–20′ high, terminated by a spike 9″–1½′ long, and, including its leaves 4″–5″ thick; leaves narrowly linear-subulate, those of the spike similar to those below, spinulose-pointed, spreading, conspicuously bristle-toothed below the middle, those of the spike with long setaceous tips; sporanges transversely oval, splitting to near the base.

In pine-barren swamps, New Jersey to Florida, near the coast, west to Mississippi. Aug.–Oct.

5. Lycopodium obscùrum L. Ground Pine. (Fig. 92.)

Lycopodium obscurum L. Sp. Pl. 1102. 1753.

Lycopodium dendroideum Michx. Fl. Bor. Am. 2: 282. 1803.

Stems erect, 6′–12′ high, bushy-branched, the branches fan-like, the rootstocks subterranean, nearly horizontal. Leaves lanceolate-linear, acute, entire, 8-ranked on the main stem, those of the branches 6-ranked, with the two upper and the two lower ranks shorter and appressed, or all alike and equally incurved-spreading, densely clothing the stems up to the bases of the spikes; spikes 1–10 on each plant, ½′–1½′ long, composed of many-ranked ovate scarious-margined bracts (scale-like leaves), each with a transversely oval sporange in its axil.

In moist woods, Newfoundland and Labrador to Alaska, south to the mountains of North Carolina and to Indiana. Ascends to 4000 ft. in Virginia. Also in Asia. July–Sept.

6. Lycopodium annótinum L. Stiff Club-moss. (Fig. 93.)

Lycopodium annotinum L. Sp. Pl. 1103. 1753.

Stems much branched, slender, prostrate and creeping, rather stiff, 1°–4° long, the branches similar, ascending, 5′–8′ high, sparingly forked. Leaves uniform, spreading, 5-ranked, rigid, linear-lanceolate, minutely serrulate, nerved below; spikes solitary or several at the ends of the branches, oblong-cylindric, 1′–2½′ long, composed of ovate or ovate-cordate, short-acuminate and denticulate bracts, each with a sporange in its axil; spores smooth or spinulose-reticulated on the basal surface.

In woods and thickets, commonly in dry soil, Labrador to Alaska, south to New Jersey, West Virginia, Michigan, Colorado and Washington. Also in Europe and Asia. Mountain forms with more rigid pointed leaves have been separated as var. *pungens*. Autumn.

7. Lycopodium alpìnum L. Alpine Club-moss. (Fig. 94.)

Lycopodium alpinum L. Sp. Pl. 1104. 1753.

Stems elongated, creeping, with ascending densely clustered crowded dichotomous branches. Leaves 4-ranked, erect-imbricate, adnate-decurrent, of two forms; those of the lateral rows lanceolate, falcate, acute, carinate, concave within, those of the intermediate rows scarcely one-third as large, lanceolate-subulate, the upper and lower rows alike; spikes solitary at the apices of slightly elongated branches, erect, closely sessile, the stems leafy to their bases; bracts broadly ovate, acuminate, dentate; spores reticulated.

In woods, Labrador to Lake Superior, Washington and Alaska. Sometimes united with *L. complanatum*. Also in Europe and Asia.

8. Lycopodium sabinaefòlium Willd. Cedar-like Club-moss. (Fig. 95.)

Lycopodium sabinaefolium Willd. Sp. Pl. 5 : 20. 1810.

Stems elongated, creeping, or more usually subterranean with short erect dichotomous clustered ascending branches, 2′–3′ long. Leaves 4-ranked, small, appressed or slightly curved outward, lanceolate, mucronate, entire, apparently terete; spikes short-peduncled, solitary, cylindric, with cordate acuminate erose-denticulate or entire bracts; sporanges transversely oval or somewhat reniform, deeply splitting.

In cold woods, Labrador to New Jersey and British Columbia.

9. Lycopodium clavàtum L. Running Pine. Club-moss. (Fig. 96.)

Lycopodium clavatum L. Sp. Pl. 1101. 1753.

Stems extensively creeping, 1°–4° long with similar short irregular ascending or decumbent densely leafy branches. Leaves much crowded, many-ranked, incurved, linear-subulate, bristle-tipped, the lower denticulate, the upper nearly entire and slightly decurrent on either side; spikes 1–4 on long 8-striate peduncles; bracts membranous, roundish, erose-denticulate below, bearing in the axil a transversely oval sporange which splits nearly to the base; spores narrowly reticulate.

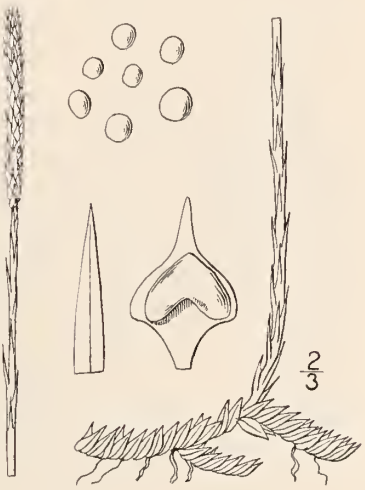
In woods, Labrador to Alaska, south to North Carolina, Michigan and Washington. Also in Europe, Asia and Central America. The spores of this species, and those of *L. complanatum*, furnish the inflammable powder known as Lycopodium powder or vegetable sulphur, used in stage effects. Aug.–Oct.

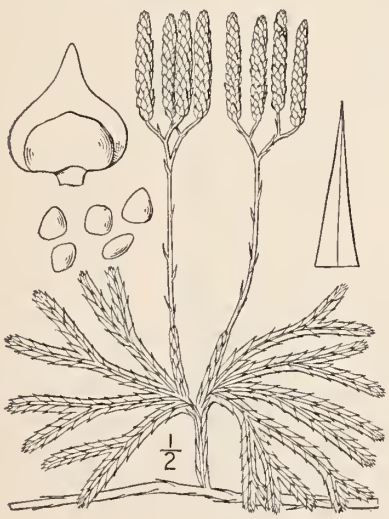
10. Lycopodium Carolinià̀num L. Carolina Club-moss. (Fig. 97.)

Lycopodium Carolinianum L. Sp. Pl. 1104. 1753.

Sterile stems and their few short branches entirely creeping, closely appressed to the earth, 1′–3′ long, emitting numerous roots on the lower side. Leaves of fertile stems of two forms, the lateral ones broadly lanceolate, acute and somewhat oblique, 1-nerved, widely spreading, in 2 ranks with a shorter, intermediate row appressed on the upper side; peduncles simple, slender, 2′–6′ high, clothed with small bract-like leaves and bearing a single cylindric spike; bracts cordate, short-acuminate, mostly entire with transversely oval sporanges in the upper axils.

In moist pine barrens, New Jersey to Florida and Louisiana near the coast.





11. Lycopodium complanàtum L. Trailing Christmas-green. (Fig. 98.)

Lycopodium complanatum L. Sp. Pl. 1104. 1753.

Stems extensively creeping, with erect or ascending reniform or fan-shaped branches several times forked above, with crowded flattened branchlets. Leaves minute, imbricate-appressed, 4-ranked, the lateral rows with somewhat spreading tips, the intermediate smaller, narrower and wholly appressed, forming a flat surface; peduncle slender, 2′–6′ high, dichotomous, bearing 2–4 linear-cylindric spikes; bracts broadly ovate, acuminate, the margins pale and erose; sporanges transversely oval, deeply splitting.

In woods and thickets, Newfoundland to Alaska, south to North Carolina, Michigan and British Columbia. Also in Europe and Asia. Forms with less distinctly dimorphous leaves and narrower, more erect and bushy branches have been separated as var. *Chamaecyparissus*.

Family 10. **SELAGINELLÀCEAE** Underw. Native Ferns 103. 1881.

Terrestrial, annual or perennial, moss-like plants with branching stems and scale-like leaves, which are many-ranked and uniform, or 4-ranked and of two types spreading in two planes. Sporanges 1-celled, solitary in the axils of leaves which are so arranged as to form more or less quadrangular spikes, some containing 4 macrospores (macrosporanges), others containing numerous microspores (microsporanges), which develop into small prothallia, those from the macrospores bearing archegones, those from the microspores antherids.

The family consists of the following genus:

1. **SELAGINÉLLA** Beauv. Prodr. Aetheog. 101. 1805.

Characters of family. [Name diminutive of Selago, an ancient name of some *Lycopodium*.]

About 335 species of very wide geographic distribution, most abundant and largest in tropical regions. In addition to the following some 5 others occur in western North America.

Stem-leaves all alike, many-ranked.
Stems compact with rigid leaves; spikes quadrangular. 1. *S. rupestris.*
Stems slender; leaves lax, spreading; spikes enlarged, scarcely quadrangular. 2. *S. selaginoides.*
Stem-leaves of 2 kinds, 4-ranked, spreading in 2 planes. 3. *S. apus.*

1. Selaginella rupéstris (L.) Spring. Rock Selaginella. (Fig. 99.)

Lycopodium rupestre L. Sp. Pl. 1101. 1753.
Selaginella rupestris Spring in Mart. Fl. Bras. 1: Part 2, 118. 1840.

Stems densely tufted, with occasional sterile runners and sub-pinnate branches, 1′–3′ high, commonly curved when dry. Leaves rigid, appressed-imbricated, 1″ or less long, linear or linear-lanceolate, convex on the back, more or less ciliate, many-ranked, tipped with a distinct transparent awn; spikes sessile at the ends of the stem or branches, strongly quadrangular, 6″–12″ long, about 1″ thick; bracts ovate-lanceolate, acute or acuminate, broader than the leaves of the stem; macrosporanges and microsporanges borne in the same spikes, the former more abundant.

On dry rocks, throughout the northern hemisphere, and in Africa. Ascends to at least 2000 ft. in Virginia. Aug.–Oct.

2. Selaginella selaginoides (L.) Link. Low Selaginella. (Fig. 100.)

Lycopodium selaginoides L. Sp. Pl. 1101. 1753.
Selaginella spinosa Beauv. Prodr. Aetheog. 112. 1805.
Selaginella selaginoides Link, Fil. Hort. Berol. 158. 1841.

Sterile branches prostrate-creeping, slender, ½′–2′ long, the fertile erect or ascending, thicker, 1′–3′ high, simple; leaves lanceolate, acute, lax and spreading, sparsely spinulose-ciliate, 1″–2″ long; spikes solitary at the ends of the fertile branches, enlarged, oblong-linear, subacute, 1′ or less long, 2″–2½″ thick; bracts of the spike lax, ascending, lanceolate or ovate-lanceolate, strongly ciliate.

On wet rocks, Labrador to Alaska, south to New Hampshire, Michigan and Colorado. Also in northern Europe and Asia. Summer.

3. Selaginella àpus (L.) Spring. Creeping Selaginella. (Fig. 101.)

Lycopodium apodum L. Sp. Pl. 1105. 1753.

Selaginella apus Spring in Mart. Fl. Bras. 1: Part. 2, 119. 1840.

Annual, light green, stems prostrate-creeping, 1′–4′ long, much branched, flaccid, angled on the face. Leaves minute, membranous, of 2 kinds, 4-ranked, spreading in 2 planes; upper leaves of the lower plane spreading, the lower reflexed, ovate, acute, serrulate, not distinctly ciliate; leaves of the upper plane ovate, short-cuspidate; spikes 3″–8″ long, obscurely quadrangular; bracts ovate, acute, sometimes serrulate, acutely keeled in the upper half; macrosporanges more abundant toward the base of the spike.

In moist shaded places, often among grass, Maine and Ontario to the Northwest Territory, south to Florida, Louisiana and Texas. Ascends to 2200 ft. in Virginia. July–Sept.

Family 11. ISOETÀCEAE. Underw. Native Ferns, 104. 1881.

QUILLWORT FAMILY.

Aquatic or marsh plants rooting in the mud, with a short buried 2-lobed or 3-lobed trunk (stem) sending out abundant roots and sending up a compact tuft of rush-like leaves. Sporanges sessile in the axils of the leaves, some containing macrospores (macrosporanges), others microspores (microsporanges); the former germinate into prothallia bearing only archegones, the latter into prothallia bearing usually only a single antherid.

The family consists of the following genus only.

1. ISÒETES L. Sp. Pl. 1100. 1753.

Submerged, amphibious or uliginous plants with a cluster of elongated awl-shaped leaves rising from a more or less 2–3-lobed fleshy short stem, the leaves with or without peripheral bast-bundles, with or without stomata, bearing a small membranous organ (ligule) above the base. Sporanges sessile in the excavated bases of the leaves, orbicular or ovoid, the sides more or less covered with a fold of the inner side of the leaf-base (velum). The sporanges of the outer leaves usually contain spherical, mostly sculptured macrospores, those of the inner ones contain minute powdery usually oblong microspores. [Name Greek, taken from Pliny, apparently referring to the persistent green leaves.]

About 50 species, widely distributed. Besides the following 2 are known from the southern United States, 7 from the Pacific Coast and 2 from Mexico. Owing to their aquatic habitat and apparently local distribution, these plants are popularly little known. The spores mature in summer and autumn.

Submerged or rarely emersed in very dry seasons; leaves quadrangular, without peripheral bast-bundles.
- Stomata wanting; macrospores crested.
  - Leaves stout, rigid, scarcely tapering. 1. *I. lacustris.*
  - Leaves slender, tapering. 2. *I. Tuckermani.*
- Stomata present; macrospores echinate. 3. *I. echinospora.*

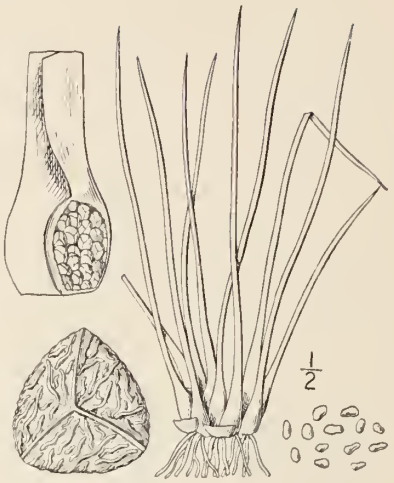
Amphibious or submerged only in earlier stages; stomata always present on the quadrangular leaves.
- Peripheral bast-bundles wanting; velum partial.
  - Leaves 2′–3′ long; macrospores with minute warts. 4. *I. saccharata.*
  - Leaves 4′–8′ long; macrospores with jagged crests. 5. *I. riparia.*
- Peripheral bast-bundles present; macrospores honeycombed-reticulate. 6. *I. Engelmanni.*

Terrestrial; stomata abundant on the triangular leaves.
- Leaves 15–60, usually black at the base. 7. *I. melanopoda.*
- Leaves 8–12, bright green, paler at the base. 8. *I. Butleri.*

1. Isoetes lacústris L. Lake Quillwort. (Fig. 102.)

Isoetes lacustris L. Sp. Pl. 1100. 1753.

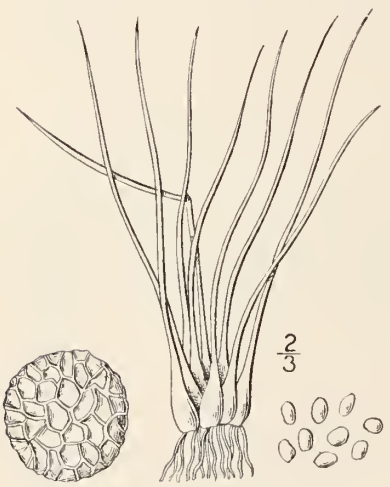
Isoetes macrospora Durieu, Bull. Soc. Bot. France, 11: 101. 1864.



Submerged or rarely above water in dry seasons; leaves 10–25, rigid, rather thick, scarcely tapering, dark or olive green, obtusely quadrangular, 2′–6′ long; stomata none; peripheral bast-bundles wanting; sporange orbicular or broadly elliptic, unspotted; velum rather narrow; ligule triangular, short or somewhat elongated; macrospores 500–800 μ in diameter, marked all over with distinct or somewhat confluent crests, and bearing three converging ridges; microspores 35–46 μ long, smooth.

In 1°–5° of water, Labrador to the Northwest Territory, south to eastern Massachusetts and New Jersey. Also in Europe and Asia.

2. Isoetes Tuckermáni A. Br. Tuckerman's Quillwort. (Fig. 103.)



Isoetes Tuckermani A. Br. in A. Gray, Man. Ed. 5, 676. 1867.

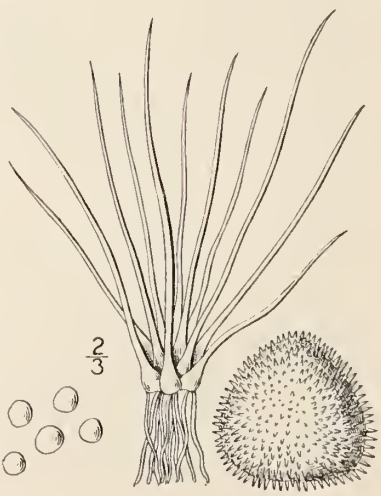
Submerged or rarely partly or wholly emersed during very dry seasons; leaves 10–30, very slender, tapering, olive-green, quadrangular, 2′–3′ long, without peripheral bast-bundles, the outer recurved; sporange oblong, mostly white, its upper one-third covered by the velum; macrospores 440–560 μ in diameter, with wavy somewhat parallel and branching ridges on the upper half, separated by the three converging ridges, the lower covered with an irregular network; microspores 26–32 μ long, nearly smooth.

In ponds, Newfoundland to Middlesex county, Massachusetts, clustered in shallow water.

3. Isoetes echinóspora Braùnii (Durieu) Engelm. Braun's Quillwort. (Fig. 104.)

Isoetes Braunii Durieu, Bull. Soc. Bot. France, 11: 101. 1864.

Isoetes echinospora var. *Braunii* Engelm. in A. Gray, Man. Ed. 5, 676. 1867.



Submerged or in dry seasons emersed, leaves 12–25, tapering, soft, reddish-green, 3′–6′ long, without peripheral bast-bundles, bearing stomata only toward the tip; sporange orbicular or broadly elliptic, spotted, one-half to three-fourths covered with the velum; macrospores 400–500 μ in diameter, covered with broad spinules which are often slightly confluent and incised at the tips; microspores 26–30 μ long, smooth.

Labrador and Greenland to Alaska, south to New Jersey, Pennsylvania and Utah.

Isoetes echinóspora robústa Engelm. Trans. St. Louis Acad. 4: 380. 1882.

Much larger than the preceding, leaves 25–70 or even more, 5′–12′ long, with abundant stomata throughout. With the preceding.

Isoetes echinóspora Boóttii Engelm. in A. Gray, Man. Ed. 5, 676. 1867.

Leaves 12–20, soft, erect, bright green, 4′–5′ long, with a few stomata near their tips; sporange nearly orbicular, with pale spots, two-thirds or more covered by the velum; macrospores 390–500μ in diameter, with longer and more slender simple spinules; microspores 26–30μ long. In ponds, Middlesex county, Massachusetts, usually submerged.

Isoetes echinóspora muricàta (Durieu) Engelm. in A. Gray, Man. Ed. 5, 676. 1867.

Isoetes muricata Durieu, Bull. Soc. Bot. France, 11: 100. 1864.

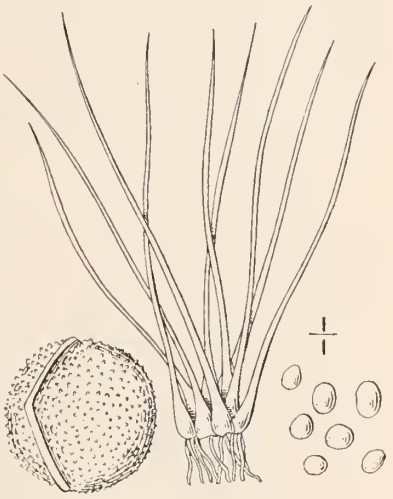
Leaves 15–20, flaccid, bright green, 6′–12′ long, bearing few stomata; sporange broadly oval, with pale-spots, about one-half covered by the velum; macrospores 400–580μ in diameter, with shorter and more confluent, almost crest-like spinules; microspores 28–32μ, slightly rough on the edges. Submerged in running water in tributaries of Mystic Pond, Middlesex county, Mass.

4. Isoetes saccharàta Engelm. Sugary Quillwort. (Fig. 105.)

Isoetes saccharata Engelm. in A. Gray, Man Ed. 5, 676. 1867.

Amphibious or uliginous with a flat depressed trunk. Leaves 10–20, olive-green, pale at the base, spreading, 2′–3′ long, quadrangular, bearing numerous stomata; sporange oblong, unspotted, with a narrow velum covering only one-fourth or one-third of its surface; peripheral bast bundles wanting; ligule triangular, rather short; macrospores 400–470 μ in diameter, with very minute distinct or rarely confluent warts as if sprinkled with grains of sugar; microspores papillose, 24–28 μ long.

In mud overflowed by the tides, Wicomico and Nanticoke Rivers, eastern Maryland.



5. Isoetes ripària Engelm. Riverbank Quillwort. (Fig. 106.)

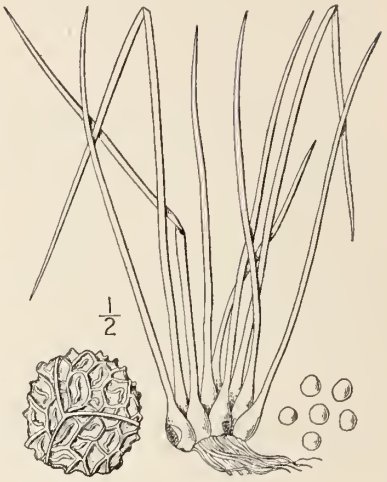
Isoetes riparia Engelm.; A. Br. Flora, 29: 178. 1846.

Amphibious or uliginous, usually emersed when mature; leaves 15–30, deep green, rather rigid, 4′–8′ long, quadrangular, bearing numerous stomata; peripheral bast-bundles wanting; ligule rather short, triangular; sporange mostly oblong, distinctly spotted with groups of brown cells, one-fourth or rarely one-half covered with the velum; macrospores 450–650 μ in diameter, marked with distinct or anastomosing jagged crests or somewhat reticulate on the lower side; microspores 28–32 μ long, more or less tuberculate.

Borders of the lower Delaware River to Maine.

6. Isoetes Engelmánni A. Br. Engelmann's Quillwort. (Fig. 107.)

Isoetes Engelmanni A. Br. Flora, 29: 178. 1846.



Amphibious, usually partly emersed when mature. Leaves 25–100, light green, quadrangular, tapering, 9′–20′ long, bearing abundant stomata; peripheral bast-bundles present; sporange oblong or linear-oblong, unspotted; velum narrow; macrospores 400–520 μ in diameter, covered with honeycomb-like reticulations; microspores 24–28 μ long, mostly smooth.

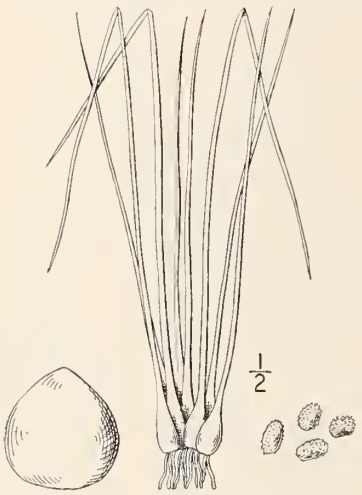
In ponds and ditches, rooting in mud, Maine to Delaware and Pennsylvania, Illinois and Missouri.

Isoetes Engelmánni válida Engelm. in A. Gray, Man. Ed. 5, 677. 1867.

Leaves 50–200, keeled on the upper side, 18′–25′ long; sporange linear-oblong, 4″–9″ long, one-third to two-thirds covered by the velum; macrospores 320–480 μ in diameter; microspores 24–27 μ long, spinulose. Warriorsmark, Cornwall and Smithville, Pa., and Wilmington, Del.

Isoetes Engelmánni grácilis Engelm. in A. Gray, Man. Ed. 5, 677. 1867.

Leaves 8–12, slender, 9′–12′ long; bast-bundles often quite small or only two present; spores as in the typical form. Southern New England to New Jersey.



7. Isoetes melanópoda J. Gay. Black-based Quillwort. (Fig. 108.)

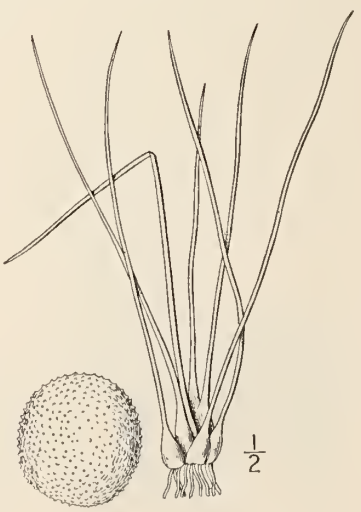
Isoetes melanopoda J. Gay, Bull. Soc. Bot. France, 11: 102. 1864.

Terrestrial with a subglobose deeply 2-lobed trunk. Leaves 15–60, slender, erect, bright green, with a blackish shining base, 5′–18′ long, triangular, bearing stomata throughout, well developed peripheral bast-bundles, thick dissepiments and small air cavities within; ligule triangular, awl-shaped; sporange mostly oblong, spotted, with a narrow velum; polygamous; macrospores 250–400 μ in diameter, with low more or less confluent tubercles, often united into worm-like wrinkles, or almost smooth; microspores 23–28μ long, spinulose.

In moist prairies and overflowed fields, Illinois to Iowa, Missouri and Texas.

8. Isoetes Bútleri Engelm. Butler's Quillwort. (Fig. 109.)

Isoetes Butleri Engelm. Coult. Bot. Gaz. 3: 1. 1878.



Terrestrial from a subglobose trunk. Leaves 8–15, bright green, paler at the base, triangular, 3′–7′ long, bearing numerous stomata, and with well developed peripheral bast-bundles, thick dissepiments and small air cavities within; sporange usually oblong, spotted; velum very narrow or none; ligule small, triangular; dioecious; macrospores 500–630 μ in diameter, with distinct or confluent tubercles; "microspores 28–34 μ long, dark brown, papillose."

On rocky hillsides, St. Louis, Missouri, and on saline flats, Indian Territory.

Subkingdom SPERMATÓPHYTA.

SEED-BEARING PLANTS.

Plants producing seeds which contain an embryo formed of one or more rudimentary leaves (cotyledons), a stem (hypocotyl, radicle), and a terminal bud (plumule), or these parts sometimes undifferentiated before germination. Microspores (pollen-grains) are borne in microsporanges (anther-sacs) on the apex or side of a modified leaf (filament). The macrosporanges (ovules) are borne on the face of a flat or inrolled much modified leaf (carpel) and contain one macrospore (embryo-sac); this develops the minute female prothallium, an archegone of which is fertilized by means of a tube (pollen-tube), a portion of the male prothallium sprouting from the pollen-grain.

The Seed-bearing plants form the most numerous group in existence, not less than 120,000 species being known. The subkingdom was formerly known as Phanerogamia, or Phaenogamia and more recently as Anthophyta, this term signifying the presence of flowers, which characterizes most of the group. But the consideration that the spore-bearing organs of the Pine Family cannot well be regarded as flowers, and the fact that the production of seeds is the most characteristic difference between these plants and the Pteridophyta, are reasons which have led to the acceptance of the term here adopted.

There are two classes in the subkingdom, which differ from each other as follows:

Ovules and seeds borne on the face of a scale; stigmas none.	Class 1. GYMNOSPERMAE.
Ovules and seeds contained in a closed cavity (ovary).	Class 2. ANGIOSPERMAE.

Class 1. *GYMNOSPÈRMAE.*

Ovules (macrosporanges) naked, not enclosed in an ovary, this represented by a scale or apparently wanting. Pollen-grains (microspores) dividing at maturity into two or more cells, one of which gives rise to the pollen-tube (male prothallium), which directly fertilizes an archegone of the nutritive endosperm (female prothallium) in the ovule.

The Gymnosperms are an ancient group, first known in Silurian time. They became most numerous in the Triassic age. They are now represented by not more than 450 species of trees and shrubs.

There are three orders, Coniferales, Cycadales and Gnetales, the first of which is represented in our area by the Pine and Yew Families.

Family 1. **PINÁCEAE** Lindl. Nat. Syst. Ed. 2, 313. 1836.

PINE FAMILY. CONIFERS.

Resinous trees or shrubs, mostly with evergreen narrow entire or scale-like leaves, the wood uniform in texture, without tracheae, the tracheids marked by large depressed disks, the pollen-sacs and ovules borne in separate spikes (aments). Perianth none. Stamens several together, subtended by a scale; filaments more or less united; pollen-sacs (anthers) 2–several-celled, variously dehiscent; pollen-grains often provided with two lateral inflated sacs. Ovules with two integuments, orthotropous or amphitropous, borne solitary or several together on the surface of a scale, which is subtended by a bract in most genera. Fruit a cone with numerous, several or few, woody, papery or fleshy scales; sometimes berry-like. Seeds wingless or winged. Endosperm fleshy or starchy, copious. Embryo straight, slender. Cotyledons 2 or several.

About 25 genera and 240 species of wide distribution, most abundant in temperate regions.

Scales of the cone numerous (except in *Larix*); leaf-buds scaly.	
Cone-scales woody; leaves needle-shaped, 2–5 in a sheath.	1. *Pinus.*
Cone-scales thin; leaves linear-filiform, scattered or fascicled, not in sheaths.	
Leaves fascicled on very short branchlets, deciduous.	2. *Larix.*
Leaves scattered, persistent.	
Cones pendulous; leaves jointed to short persistent sterigmata.	
Leaves tetragonal, sessile.	3. *Picea.*
Leaves flat, short-petioled.	4. *Tsuga.*
Cones erect; sterigmata inconspicuous or none.	5. *Abies.*
Scales of the cone few (3–12); leaf-buds naked.	
Cone-scales spiral, thick; leaves deciduous.	6. *Taxodium.*
Cone-scales opposite; leaves persistent.	
Cone oblong, its scales not peltate.	7. *Thuja.*
Cone globose, its scales peltate.	8. *Chamaecyparis.*
Fruit fleshy, berry-like, a modified cone.	9. *Juniperus.*

1. PINUS L. Sp. Pl. 1000. 1753.

Evergreen trees with two kinds of leaves, the primary ones linear or scale-like, deciduous, the secondary ones forming the ordinary foliage, narrowly linear, arising from the axils of the former in fascicles of 2–5 (rarely solitary in some western species), subtended by the bud-scales, some of which are united to form a sheath. Staminate aments borne at the bases of shoots of the season, the clusters of stamens spirally arranged, each in the axil of a minute scale; filaments very short; authers 2-celled, the sacs longitudinally dehiscent. Ovule-bearing aments solitary or clustered, borne on the twigs of the preceding season, composed of numerous imbricated minute bracts, each with an ovule-bearing scale in its axil, ripening into a large cone, which matures the following autumn, its scales elongating and becoming woody. Seeds 2 on the base of each scale, winged above, the testa crustaceous. [Name Celtic.]

Leaves 5 in a sheath; cone-scales little thickened at the tip. 1. *P. Strobus.*
Leaves 2–3 in a sheath; cone-scales much thickened at the tip.
  Cones terminal or subterminal.
    Leaves 2 in a sheath; cones 1½′–2½′ long, their scales pointless. 2. *P. resinosa.*
    Leaves 3 in a sheath; cones 4′–10′ long, their scales prickle-tipped.
      Cones light, 6′–10′ long; leaves 10′–16′ long. 3. *P. palustris.*
      Cones very heavy and woody, 4′–6′ long; leaves 5′–10′ long. 4. *P. ponderosa.*
  Cones lateral.
    Cone-scales with neither spine nor prickle; leaves in 2's. 5. *P. divaricata.*
    Cone-scales tipped with a spine or prickle.
      Leaves some or all of them in 2's.
        Cones 1½′–2½′ long, their scales tipped with prickles.
          Leaves stout, 1½′–2½′ long. 6. *P. Virginiana.*
          Leaves slender, 3′–5′ long. 7. *P. echinata.*
        Cones 3½′–5′ long, their scales tipped with very stout short spines. 8. *P. pungens.*
      Leaves in 3's (very rarely some in 2's or 4's).
        Leaves 6′–10′ long; old sheaths 6″–10″ long; cones oblong-conic. 9. *P. Taeda.*
        Leaves 3′–5′ long; old sheaths 3″–6″ long; cones ovoid. 10. *P. rigida.*

1. Pinus Strobus L. White Pine. Weymouth Pine. (Fig. 110.)

Pinus Strobus L. Sp. Pl. 1001. 1753.

A large forest tree, reaching a maximum height of 175° and a trunk diameter of 10½°, the bark nearly smooth except when old, the branches horizontal, verticillate. Leaves 5 in a sheath, very slender, pale green and glaucous, 3′–5′ long, with a single fibro-vascular bundle, the dorsal side devoid of stomata; sheath loose, deciduous; ovule-bearing aments terminal, peduncled; cones subterminal, drooping, cylindric, often slightly curved, 4′–6′ long, about 1′ thick when the scales are closed, resinous; scales but slightly thickened at the apex, obtuse and rounded or nearly truncate, without a terminal spine or prickle.

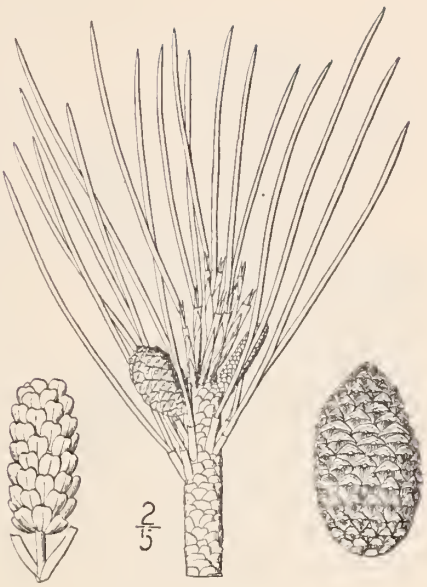
In woods, often forming dense forests, Newfoundland to Manitoba, south along the Alleghenies to Georgia and to Illinois and Iowa. Ascends to 4300 ft. in North Carolina and to 2500 ft. in the Adirondacks. Wood light brown or nearly white, soft, compact, one of the most valuable of timbers; weight per cubic foot, 24 lbs. June.

2. Pinus resinòsa Ait. Canadian Pine. Red Pine. (Fig. 111.)

Pinus resinosa Ait. Hort. Kew. 3: 367. 1789.

A tall forest tree, reaching a maximum height of about 150° and a trunk diameter of 5°, the the bark reddish, rather smooth, flaky when old. Leaves 2 in each sheath, slender, dark green, 4′–6′ long, with 2 fibro-vascular bundles; sheaths 6″–12″ long when young; staminate aments 6″–9″ long; cones subterminal, spreading, oval-conic, 1½′–2½′ long, usually less than 1′ thick while the scales are closed; scales thickened at the apex, obtuse, rounded and devoid of spine or prickle.

In woods, Newfoundland to Manitoba, south to Massachusetts, Pennsylvania and Minnesota. Wood compact, not strong, light red; weight per cubic foot 30 lbs. May–June.



3. Pinus palústris Mill. Long-leaved Pine. Georgia Pine. (Fig. 112.)

Pinus palustris Mill. Gard. Dict. Ed. 8, No. 14. 1768.
Pinus australis Michx. f. Hist. Arb. Am. 1: 64. *pl.* 6. 1810.

A large tree, sometimes attaining a height of 100° and a trunk diameter of 5°, the bark nearly smooth. Leaves in 3's, slender, dark green, clustered at the ends of the branches, much elongated (10′–16′ long), with 2 fibro-vascular bundles; sheaths 1′–1¼′ long; buds long; staminate aments rose-purple, 2′–3½′ long, very conspicuous; cones terminal, spreading or erect, conic-cylindric, 6′–10′ long, 2′–3′ thick before the scales open; scales thickened at the apex, which is provided with a transverse ridge bearing a short central recurved prickle.

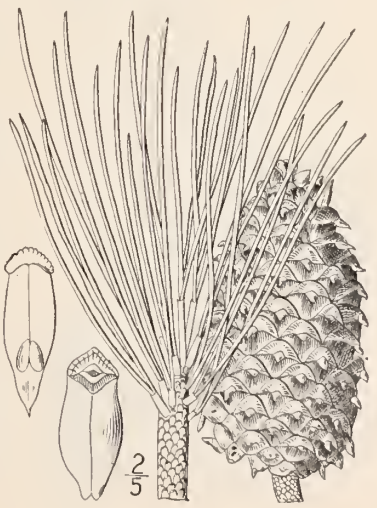
In sandy, mostly dry soil, often forming extensive forests, southern Virginia to Florida and Texas, mostly near the coast. Wood hard, strong, compact, light red or orange; weight per cubic foot 44 lbs. This tree is the chief source of our turpentine, tar, rosin, and their derivatives. Also known as Southern Pine, Yellow Pine, Hard Pine and Virginia Pine. March–April.

4. Pinus ponderòsa Dougl. Western Yellow Pine. (Fig. 113.)

Pinus ponderosa Dougl. Lawson's Man. 354. 1836.

One of the largest North American trees, attaining a maximum height of nearly 300° and a trunk diameter of 15°, but commonly much smaller. Branches widely spreading or somewhat drooping; bark light red, scaly; leaves in 3's (rarely some of them in 2's), rather stout, 5′–10′ long, slightly scabrous; cones subterminal, very dense and heavy, ovoid-conic, 4′–6′ long, 1½′–2½′ thick; scales much thickened at the apex, the transverse ridge prominent, with a triangular subulate short stout recurved prickle.

Montana to British Columbia, south to western Nebraska, Texas, Mexico and California; the shorter-leaved eastern form which reaches our area has been distinguished from the western as var. *scopulorum*. Wood hard, strong, light red; weight per cubic foot 29 lbs. One of the most important lumber-trees of the west. April–May.



5. Pinus divaricàta (Ait.) Sudw. Labrador Pine. Gray Pine. (Fig. 114.)

Pinus sylvestris var. *divaricata* Ait. Hort. Kew. 3: 366. 1789.
Pinus Banksiana Lamb. Pinus, 1: 7. *pl. 3.* 1803.
Pinus divaricata Sudw. Bull. Torr. Club, 20: 44. 1893.

A slender tree, usually 40°–60° high, but sometimes reaching 100°, and a trunk diameter of 3½°, the branches spreading, the bark becoming flaky. Leaves in 2's, stout, stiff, more or less curved, spreading or oblique, light green, crowded along the branches, seldom over 1′ long; fibro-vascular bundles 2; cones commonly very numerous, lateral, oblong-conic, usually upwardly curved, 1′–2′ long, 9″–15″ thick when mature; scales thickened at the end, the transverse ridge a mere line with a minute central point in place of spine or prickle at maturity; young scales spiny-tipped.

In sandy soil, sometimes forming extensive forests, New Brunswick to Hudson Bay and the Northwest Territory, south to Maine, northern New York, northern Illinois and Minnesota. Wood soft, weak, compact, light brown; weight per cubic foot 27 lbs. Also called Hudson Bay Pine and Northern Scrub Pine. May–June.

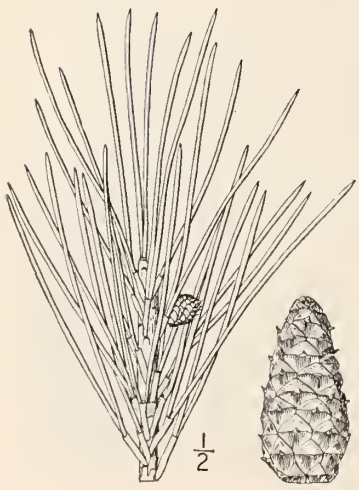
6. Pinus Virginiàna Mill. Jersey Pine. Scrub Pine. (Fig. 115.)

Pinus Virginiana Mill. Gard. Dict. Ed. 8, No. 9. 1768.
Pinus inops Ait. Hort. Kew. 3: 367. 1789.

A slender tree, usually small, but sometimes attaining a height of 110° and a trunk diameter of 3°, the old bark dark colored, flaky, the branches spreading or drooping. Leaves in 2's, dark green, rather stout and stiff, spreading when old, 1½′–2½′ long, with 2 fibro-vascular bundles; young sheaths rarely more than 2½″ long; cones commonly few, lateral, recurved when young, spreading when old, oblong-conic, 1½′–2½′ long, their scales somewhat thickened at the apex, the low transverse ridge with a short central more or less recurved prickle.

In sandy soil, Long Island, New York to South Carolina, west to southern Indiana and Kentucky, sometimes forming forests. Ascends to 3300 ft. in Virginia. Wood soft, weak, brittle, light orange; weight per cubic foot 33 lbs. April–May.

7. Pinus echinàta Mill. Yellow Pine. Spruce Pine. (Fig. 116.)



Pinus echinata Mill. Gard. Dict. Ed. 8, No. 12. 1768.
Pinus mitis Michx. Fl. Bor. Am. 2: 204. 1803.

A forest tree, reaching a maximum height of about 100° and a trunk diameter of 4½°, the branches spreading, the old bark rough in plates. Leaves some in 2's, some in 3's, slender, not stiff, dark green, 3′–5′ long, spreading when mature; fibro-vascular bundles 2; young sheaths 5″–8″ long; cones lateral, oblong-conic, about 2′ long, usually less than 1′ thick when the scales are closed; scales thickened at the apex, marked with a prominent transverse ridge and armed with a slender small nearly straight early deciduous prickle.

In sandy soil, southern New York to Florida, west to Illinois, Kansas and Texas. Wood heavy, strong, orange; one of the most valuable timbers; weight per cubic foot 38 lbs. Also called Short-leaved Pine and Bull Pine. May–June.

8. Pinus pùngens Michx. f. Table-Mountain Pine. Hickory Pine. (Fig. 117.)

Pinus pungens Michx. f. Hist. Arb. Am. 1: 61. *pl. 5.* 1810.

A tree with a maximum height of abont 60° and trunk diameter of 3½°, the branches spreading, the old rongh bark in flakes. Leaves mostly in 2's, some in 3's, stont and stiff, light green, 2½′–4′ long, crowded on the twigs; fibro-vascnlar bnndles 2; young sheaths 5″–8″ long; cones lateral, usually clustered, long-persistent on the branches, ovoid, 3½′–5′ long, 2′–3′ thick while the scales are closed, nearly globular when these are expanded; scales very thick and woody, their ends with a large elevated transverse ridge, centrally tipped by a stout reflexed or spreading spine 2″–2½″ long.

In woods, sometimes forming forests, western New Jersey and central Pennsylvania to North Carolina and Tennessee. Ascends to 4000 ft. in North Carolina. Wood soft, weak, brittle, light brown; weight per cubic foot 31 lbs. May.

9. Pinus Taèda L. Loblolly Pine. Old-field Pine. (Fig. 118.)

Pinus Taeda L. Sp. Pl. 1000. 1753.

A large forest tree, reaching nnder favorable conditions, a height of 150° and a trnnk diameter of 5°, the branches spreading, the bark thick and rugged, flaky in age. Leaves in 3's (rarely some of them in 2's), slender, not stiff, light green, ascending or at length spreading, 6′–10′ long; fibro-vascnlar bundles 2; sheaths 8″–12″ long when yonng; cones lateral, spreading, oblong-conic, 3′–5′ long, 1′–1½′ thick before the scales open; scales thickened at the apex, the transverse ridge prominent, acnte, tipped with a central short triangnlar reflexed-spreading spine.

Delaware to Florida and Texas, mostly near the coast, north through the Mississippi Valley to Arkansas. Wood not strong, brittle, coarse-grained, light brown; weight per cubic foot 34 lbs. Springs up in old fields or in clearings. Also called Frankincense Pine. April–May.

10. Pinus rígida Mill. Pitch Pine. Torch Pine. (Fig. 119.)

Pinus rigida Mill. Gard. Dict. Ed. 8, No. 10. 1768.

A forest tree reaching a maximnm height of about 80° and a trunk diameter of 3°, the branches spreading, the old bark rough, furrowed, flaky in strips. Leaves in 3's (very rarely some in 4's), stout and stiff, rather dark green, 3′–5′ long, spreading when matnre; fibro-vascular bundles 2; sheaths 4″–6″ long when young; cones lateral, ovoid, 1½′–3′ long, becoming nearly globnlar when the scales open, commonly nnmerons and clustered; scales thickened at the apex, the transverse ridge acute, provided with a stont central triangular recnrved-spreading prickle.

In dry, sandy or rocky soil, New Brunswick to Georgia, west to southern Ontario, West Virginia and Kentucky. Ascends to 3000 ft. in Virginia. This forms most of the "pine barrens" of Long Island and New Jersey. Wood soft, brittle, coarse-grained, light reddish-brown; weight per cubic foot 32 lbs. Also called Sap Pine and Candlewood Pine; produces numerous shoots from cut stumps. April–May.

2. LÀRIX Adans. Fam. Pl. 2: 480. 1763.

Tall trees with horizontal or ascending branches and small narrowly linear deciduous leaves, without sheaths, in fascicles on short lateral scaly bud-like branchlets. Aments short, lateral, monoecious, the staminate from leafless buds; the ovule-bearing buds commonly leafy at the base and the aments red. Anther sacs 2-celled, the sacs transversely or obliquely dehiscent. Pollen-grains simple. Cones ovoid or cylindric, small, erect, their scales thin, spirally arranged, obtuse, persistent. Ovules 2 on the base of each scale, ripening into 2 reflexed somewhat winged seeds. [Name ancient, probably Celtic.]

About 9 species, natives of the north temperate and subarctic zones. Besides the following 2 others occur in the western parts of North America.

1. Larix laricina (Du Roi) Koch. American Larch. Tamarack (Fig. 120.)

Pinus laricina Du Roi, Obs. Bot. 49. 1771.
Pinus pendula Ait. Hort. Kew. 3: 369. 1789.
Larix Americana Michx. Fl. Bor. Am. 2: 203. 1803.
Larix laricina Koch, Dendrol. 2: Part 2, 263. 1873.

A slender tree, attaining a maximum height of about 100° and a trunk diameter of 3°, the branches spreading, the bark close or at length slightly scaly. Leaves pale green, numerous in the fascicles, 5″–12″ long, about ¼″ wide, deciduous in late autumn; fascicles borne on short lateral branchlets about 2″ long; cones short-peduncled at the ends of similar branchlets, ovoid, obtuse, 6″–8″ long, composed of about 12 suborbicular thin scales, their margins entire or slightly lacerate.

In swampy woods and about margins of lakes, Newfoundland to the Northwest Territory, south to New Jersey, Pennsylvania, Indiana and Minnesota. Wood hard, strong, very durable, resinous, light brown; weight per cubic ft. 39 lbs. Called also Hackmatack. March–April.

3. PÌCEA Link, Abh. Akad. Wiss. Berlin, 1827: 179. 1827–1830.

Evergreen conical trees, with linear short 4-sided leaves spreading in all directions, jointed at the base to short persistent sterigmata, on which they are sessile, falling away in drying, the bare twigs appearing covered with low truncate projections. Leaf-buds scaly. Staminate aments axillary, nearly sessile; anthers 2-celled, the sacs longitudinally dehiscent, the connective prolonged into an appendage; pollen-grains compound; ovule-bearing aments, terminal, ovoid or oblong; ovules 2 on the base of each scale, reflexed, ripening into 2 more or less winged seeds. Cones ovoid or oblong, obtuse, pendulous, their scales numerous, spirally arranged, thin, obtuse, persistent. [Name ancient.]

About 14 species, natives of the north temperate and subarctic zones. Besides the following, 3 others occur in the northwestern parts of North America.

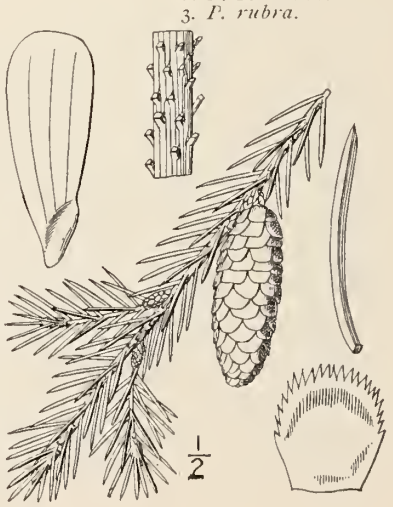
Twigs and sterigmata glabrous, glaucous; cones oblong-cylindric. 1. *P. Canadensis.*
Twigs pubescent, brown; cones ovoid or oval.
  Twigs stout; leaves mucronate; cones persistent. 2. *P. Mariana.*
  Twigs slender; leaves very acute; cones deciduous. 3. *P. rubra.*

1. Picea Canadénsis (Mill.) B.S.P. White Spruce. (Fig. 121.)

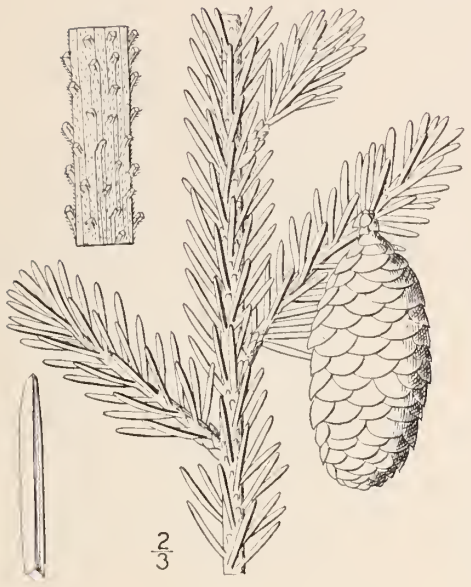
Abies Canadensis Mill. Gard. Dict. Ed. 8, No. 4. 1768.
Pinus alba Ait. Hort. Kew. 3: 371. 1789.
Abies alba Michx. Fl. Bor. Am. 2: 207. 1803. Not Mill. 1768.
Picea alba Link, Linnaea, 15: 519. 1841.
Picea Canadensis B.S.P. Prel. Cat. N. Y. 71. 1888.

A slender tree, attaining a maximum height of about 150° and a trunk diameter of 3°, but usually much smaller. Twigs and sterigmata glabrous, pale and glaucous; leaves light green, slender, 6″–8″ long, very acute; cones cylindric or oblong-cylindric, pale, 1½′–2′ long, 6″–8″ thick before the scales open; scales almost membranaceous, their margins usually quite entire; bracts incised.

Newfoundland to Hudson Bay and Alaska, south to Maine, northern New York, Michigan, the Black Hills, Montana and British Columbia. Wood soft, weak, light yellow; weight per cubic foot 25 lbs. April–May.



2. Picea Marìana (Mill.) B.S.P. Black Spruce. (Fig. 122.)



Abies Mariana Mill. Gard. Dict. Ed. 8, No. 5. 1768.
Pinus nigra Ait. Hort. Kew. 3: 370. 1789.
Abies nigra Desf. Hist. Arb. 2: 580. 1809.
Picea nigra Link, Linnaea, 15: 520. 1841.
Picea Mariana B.S.P. Prel. Cat. N. Y. 71. 1888.

A slender tree, sometimes 90° high, the trunk reaching a diameter of 2°–3°, the branches spreading, the bark only slightly roughened. Twigs stout, pubescent; sterigmata pubescent; leaves thickly covering the twigs, deep green, stout, straight or curved, rarely more than ½′ long, obtuse or merely mucronate at the apex; cones oval or ovoid, 1′–1½′ long, persistent on the twigs for two or more seasons, their scales with entire or merely erose margins.

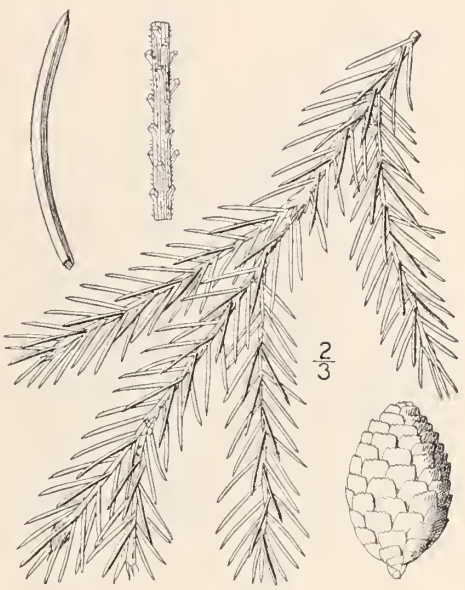
Newfoundland to Hudson Bay and the Northwest Territory, south to New Jersey, along the higher Alleghenies to North Carolina and to Michigan and Minnesota. Wood soft, weak, pale red or nearly white; weight per cubic foot 28 lbs. May–June.

3. Picea rùbra (Lamb.) Link. Red Spruce. (Fig. 123.)

Pinus rubra Lamb. Pinus, 1: 43. *pl. 28.* 1803.
Picea rubra Link, Linnaea, 15: 521. 1841.
Picea nigra var. *rubra* Engelm. Gard. Chron. (II.) 11: 334. 1879.

A slender tree, sometimes reaching a height of 100° and a trunk diameter of 4°, the branches spreading, the bark reddish, nearly smooth. Twigs slender, sparingly pubescent; sterigmata glabrate; leaves light green, slender, straight or sometimes incurved, very acute at the apex, 5″–8″ long; cones ovoid or oval, seldom more than 1′ long, deciduous at the end of the first season or during the winter, their scales undulate, lacerate, or 2-lobed.

Nova Scotia to northern New York and along the higher Alleghenies to southern Virginia. Ascends to 4500 ft. in the Adirondacks. Wood similar to that of the preceding species. May–June.



4. TSÙGA Carr. Trait. Conif. 185. 1855.

Evergreen trees with slender horizontal or drooping branches, flat narrowly linear scattered short-petioled leaves, spreading and appearing 2-ranked, jointed to very short sterigmata and falling away in drying. Leaf-buds scaly. Staminate aments axillary, short or subglobose; anthers 2-celled, the sacs transversely dehiscent, the connective slightly produced beyond them; pollen-grains simple. Ovule-bearing aments terminal, the scales about as long as the bracts, each bearing 2 reflexed ovules on its base. Cones small, ovoid or oblong, pendulous, their scales scarcely woody, obtuse, persistent. Seeds somewhat winged. [Name Japanese.]

About 7 species, the following of eastern North America, 2 in northwestern North America, 2 or 3 Asiatic.

Cones 6″–10″ long, their scales remaining appressed. 1. *T. Canadensis.*
Cones 1′–1¼′ long, their scales widely spreading at maturity. 2. *T. Caroliniana.*

1. Tsuga Canadénsis (L.) Carr. Hemlock. (Fig. 124.)

Pinus Canadensis L. Sp. Pl. Ed. 2, 1421. 1763.
Abies Canadensis Michx. Fl. Bor. Am. 2: 206. 1803.
Tsuga Canadensis Carr. Trait. Conif. 189. 1855.

A tall forest tree, sometimes 110° high, the trunk reaching 4° in diameter, the lower branches somewhat drooping, the old bark flaky in scales. Foliage dense; leaves obtuse, flat, 6″–9″ long, less than 1″ wide, dark green above, pale beneath, the petiole less than one-half as long as the width of the blade; cones oblong, obtuse, as long as or slightly longer than the leaves, their scales suborbicular, obtuse, minutely lacerate or entire, not widely spreading at maturity.

Nova Scotia to Minnesota, south to Delaware, along the Alleghenies to Alabama and to Michigan and Wisconsin. Ascends to 2000 ft. in the Adirondacks. One of the most ornamental of evergreens when young. Wood soft, weak, brittle, coarse-grained, light brown or nearly white; weight per cubic foot 26 lbs. Bark much used in tanning. April–May.

2. Tsuga Caroliniàna Engelm. Carolina Hemlock. (Fig. 125.)

Tsuga Caroliniana Engelm. Coult. Bot. Gaz. 6: 223. 1881.
Abies Caroliniana Chapm. Fl. S. States, Ed. 2, 650. 1883.

A forest tree attaining a maximum height of about 80° and a trunk diameter of 4°, the lower branches drooping. Leaves narrowly linear, obtuse, rather light green above, nearly white beneath, 7″–10″ long, the petiole nearly as long as the width of the blade; cones 1′–1¼′ long, the scales firm but scarcely woody, oblong, obtuse, widely spreading at maturity.

Southwestern Virginia to South Carolina in the Alleghenies. Wood soft, weak, brittle, light brown; weight per cubic foot about 27 lbs. A more graceful and beautiful tree than the preceding at maturity. Ascends to 4200 ft. in North Carolina. April.

5. ÀBIES Juss. Gen. 414. 1789.

Evergreen trees with linear flat scattered sessile leaves, spreading so as to appear 2-ranked, but in reality spirally arranged, not jointed to sterigmata, and commonly quite persistent in drying, the naked twigs marked by the flat scars of their bases. Staminate aments axillary; anthers 2-celled, the sacs transversely dehiscent, the connective prolonged into a short knob or point; pollen-grains compound. Ovule-bearing aments lateral, erect; ovules 2 on the base of each scale, reflexed, the scale shorter than or exceeding the thin or papery, mucronate or aristate bract. Cones erect, subcylindric or ovoid, their scales deciduous from the persistent axis, orbicular or broader, obtuse. [Ancient name of the firs.]

About 20 species, natives of the north temperate zone, chiefly in boreal and mountainous regions. Besides the following, some 7 others occur in the western parts of North America and 1 in Mexico.

Bracts serrulate, mucronate, shorter than the scales. 1. *A. balsamea.*
Bracts aristate, reflexed, longer than the scales. 2. *A. Fraseri.*

1. Abies balsàmea (L.) Mill. Balsam Fir. (Fig. 126.)

Pinus balsamea L. Sp. Pl. 1002. 1753.
Abies balsamea Mill. Gard. Dict. Ed. 8, No. 3. 1768.

A slender forest tree attaining a maximum height of about 90° and a trunk diameter of 3°, usually much smaller and on mountain tops and in high arctic regions reduced to a low shrub. Bark smooth, warty with resin "blisters." Leaves fragrant in drying, less than 1″ wide, 6″–10″ long, obtuse, dark green above, paler beneath or the youngest conspicuously whitened on the lower surface; cones cylindric, 2′–4′ long, 9″–15″ thick, upright, arranged in rows on the upper side of the branches, violet or purplish when young; bracts obovate, serrulate, mucronate, shorter than the broad rounded scales.

Newfoundland and Labrador to Hudson Bay and the Northwest Territory, south to Massachusetts, Pennsylvania, along the Alleghenies to Virginia and to Michigan and Minnesota. Ascends to 5000 ft. in the Adirondacks. Wood soft and weak, light brown; weight per cubic foot 24 lbs. Canada balsam is derived from the resinous exudations of the trunk. May–June.

2. Abies Fràseri (Pursh) Lindl. Fraser's Balsam Fir. (Fig. 127.)

Pinus Fraseri Pursh, Fl. Am. Sept. 639. 1814.
Abies Fraseri Lindl. Penny Cycl. 1: 30. 1833.

A forest tree, reaching a maximum size about that of the preceding species, the smooth bark bearing similar resin "blisters." Leaves, especially the younger, conspicuously whitened beneath, 5″–10″ long, nearly 1″ wide, emarginate or some of them obtuse at the apex; cones oblong-cylindric or ovoid-cylindric, 2′–3′ high, about 1′ thick, their scales rhomboid, much broader than high, rounded at the apex, much shorter than the papery bracts, which are reflexed, their summits emarginate, serrulate and aristate.

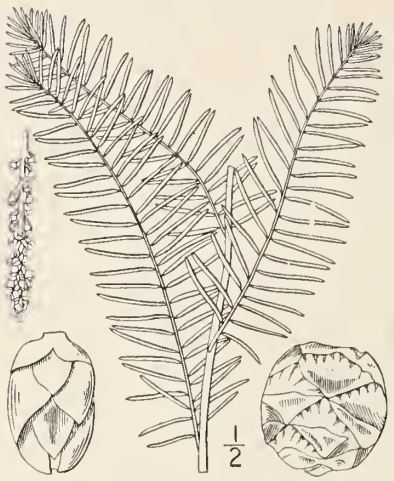
On the high Alleghenies of southwestern Virginia, North Carolina and Tennessee. Wood similar to that of the northern species, but slightly lighter in weight. May.

6. TAXÒDIUM L. C. Rich. Ann. Mus. Paris, 16: 298. 1810.

Tall trees with horizontal or drooping branches, and alternate spirally arranged sessile linear or scale-like leaves, deciduous in our species, spreading so as to appear 2-ranked, some of the twigs commonly deciduous in autumn. Leaf-buds naked. Staminate aments very numerous, globose, in long terminal drooping panicled spikes, appearing before the leaves; anthers 2–5-celled, the sacs 2-valved. Ovule-bearing aments ovoid, in small terminal clusters, their scales few, bractless, each bearing a pair of ovules on its base. Cones globose or nearly so, the scales thick and woody, rhomboid, fitting closely together by their margins, each marked with a triangular scar at its base. Seeds large, sharply triangular-pyramidal. [Name Greek, referring to the yew-like leaves.]

Three known species, the following of southeastern North America, one Mexican, one Chinese.

1. Taxodium distichum (L.) L. C. Rich. Bald Cypress. (Fig. 128.)



Cupressus disticha L. Sp. Pl. 1003. 1753.
Taxodium distichum L. C. Rich. Ann. Mus. Paris, 16: 298. 1810.

A large forest tree, attaining a maximum height of about 150° and a trunk diameter of 14°, the old bark flaky in thin strips. Leaves narrowly linear, flat, thin, 5″–10″ long, ½″ or less wide, rather light green, acute, those on some of the flowering branches smaller, scale-like; cones globose or slightly longer than thick, pendent at the ends of the branches, very compact, about 1′ in diameter; surfaces of the scales irregularly rugose above the inversely triangular scar; seeds 4″–5″ long.

In swamps and along rivers, Delaware (possibly in southern New Jersey) to Florida, west to Texas, north in the Mississippi Valley region to southern Indiana, Missouri and Arkansas. Wood soft, not strong, brown, very durable; weight per cubic foot 27 lbs. The roots develop upright conic "knees" sometimes 4° high and 1° thick. March–April.

7. THÙJA L. Sp. Pl. 1002. 1753.

Evergreen trees or shrubs with flood-like foliage, the leaves small or minute, scale-like, appressed, imbricated, opposite, 4-ranked, those of the ultimate branchlets mostly obtuse, those of some of the larger twigs acute or subulate. Aments monoecious, both kinds terminal, the staminate globose; anthers opposite, 2–4-celled, the sacs globose, 2-valved. Ovule-bearing aments ovoid or oblong, small, their scales opposite, each bearing 2 (rarely 2–5) erect ovules. Cones ovoid or oblong, mostly spreading or recurved, their scales 6–10, coriaceous, opposite, not peltate, dry, spreading when mature. Seeds oblong, broadly or narrowly winged or wingless. [Name ancient.]

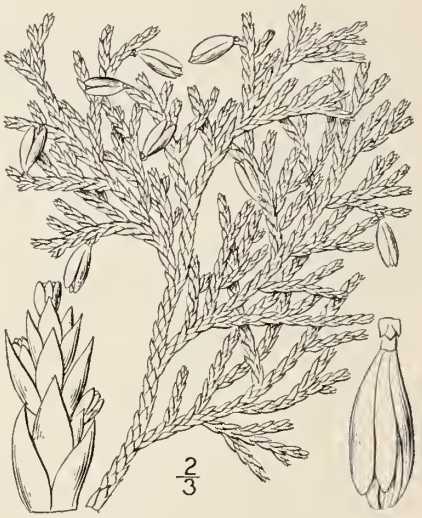
About 15 species, natives of North America and eastern Asia. Besides the following, another occurs from Idaho and Oregon to Alaska.

1. Thuja occidentàlis L. White Cedar. Arbor Vitae. (Fig. 129.)

Thuja occidentalis L. Sp. Pl. 1002. 1753.

A conical tree, reaching a height of 65° and a trunk diameter of 5°, the old bark deciduous in ragged strips. Scale-like leaves of the ultimate branchlets nearly orbicular, obtuse, 1″–1½″ broad, the two lateral rows keeled, the two other rows flat, causing the twigs to appear much flattened; leaves of the older twigs narrower and longer, acute or acuminate; mature cones 4″–6″ long, their scales obtuse; seeds broadly winged.

In wet soil and along the banks of streams, forming almost impenetrable forests northward, New Brunswick to James' Bay and Manitoba, south to New Jersey, along the Alleghenies to North Carolina and to Illinois and Minnesota. Ascends to 3500 ft. in the Adirondacks. Wood soft, brittle, weak, coarse-grained, light brown; weight per cubic foot 20 lbs. May–June.



8. CHAMAECÝPARIS Spach, Hist. Veg. 11: 329. 1842.

Evergreen trees, similar to the *Thujas*, with minute opposite appressed 4-ranked scale-like leaves, or those of older twigs subulate, and small monoecious terminal aments. Staminate aments as in *Thuja*, but the filaments broader and shield-shaped. Ovule-bearing aments globose, their scales opposite, peltate, each bearing 2–5 erect ovules. Cones globose, the scales thick, peltate, each bearing 2–5 erect seeds, closed until mature, each with a central point or knob. Seeds winged. [Greek, meaning a low cypress.]

About 7 species, the following of the eastern United States, 2 in western North America, 3 or 4 Japanese.

1. Chamaecyparis thyoides (L.) B.S.P. Southern White Cedar. (Fig. 130.)

Cupressus thyoides L. Sp. Pl. 1003. 1753.
Chamaecyparis sphaeroidea Spach, Hist. Veg. 11: 331. 1842.
Chamaecyparis thyoides B.S.P. Prel. Cat. N. Y. 71. 1888.

A forest tree, reaching a maximum height of about 90° and a trunk diameter of 4½°. Leaves of the ultimate branchlets ovate, acute, scarcely ½″ wide, those of the lateral rows keeled, those of the vertical rows slightly convex, each with a minute round discoid marking on the centre of the back, those of the older twigs narrower and longer, subulate; cones about 3″ in diameter, blue, each of their closely fitting scales with a small central point; seeds narrowly winged.

In swamps, Massachusetts to northern New Jersey, south to Florida and Mississippi, mostly near the coast. Wood soft, weak, close-grained, light brown; weight per cubic foot 21 lbs. April–May.

9. JUNÍPERUS L. Sp. Pl. 1038. 1753.

Evergreen trees or shrubs with opposite or verticillate, subulate or scale-like, sessile leaves, commonly of 2 kinds, and dioecious or sometimes monoecious, small globose axillary or terminal aments. Leaf-buds naked. Staminate aments oblong or ovoid; anthers 2–6-celled, each sac 2-valved. Ovule-bearing aments of a few opposite somewhat fleshy scales, or these rarely verticillate in 3's, each bearing a single erect ovule or rarely 2. Cones globose, berry-like by the coalescence of the fleshy scales, containing 1–6 wingless bony seeds. [Name Celtic.]

About 30 species, natives of the northern hemisphere, some of them extending into tropical regions. Besides the following, 4 or 5 others occur in the western parts of North America.

Leaves all subulate, prickly pointed, verticillate; aments axillary.
Small erect tree or shrub; leaves slender, mostly straight. 1. *J. communis.*
Low depressed shrub; leaves stouter, mostly curved. 2. *J. nana.*
Leaves of 2 kinds, scale-like and subulate, mostly opposite; aments terminal.
Tree; fruit on short straight branches. 3. *J. Virginiana.*
Depressed shrub; fruit on short recurved branches. 4. *J. Sabina.*

1. Juniperus commùnis L. Juniper. (Fig. 131.)

Juniperus communis L. Sp. Pl. 1040. 1753.

A low tree or erect shrub, sometimes attaining a height of 25° and a trunk diameter of 10′, usually smaller, the branches spreading or drooping, the bark shreddy. Leaves all subulate, rigid, spreading, or some of the lower reflexed, mostly straight, prickly pointed, verticillate in 3's, often with smaller ones fascicled in their axils, 5″–10″ long, less than 1″ wide, channeled and commonly whitened on the upper surface; aments axillary; berry-like cones sessile or very nearly so, dark blue, 3″–4″ diameter.

On dry hills, Nova Scotia to British Columbia, south to New Jersey, Pennsylvania, Michigan, western Nebraska and in the Rocky Mountains to New Mexico. Ascends to 900 ft. in Pennsylvania. Also in Europe and Asia. The fruit is used for flavoring gin. April–May. Fruit ripe Oct.

2. Juniperus nàna Willd. Low Juniper. (Fig. 132.)

Juniperus Sibirica Burgsd. Anleit. n. 272. 1787.?
Juniperus nana Willd. Sp. Pl. 4: 854. 1806.
Juniperus communis var. *alpina* Gaud. Fl. Helv. 6: 301. 1830.

A depressed rigid shrub, seldom over 18′ high, forming circular patches often 10° in diameter. Leaves similar to those of the preceding species, but stouter, similarly channeled and often whitened above, appressed-ascending, rather rigid, spiny tipped, 4″–6″ long, mostly incurved, densely clothing the twigs, verticillate in 3's; aments axillary; berry-like cones blue, 4″–5″ in diameter.

In dry, open places, Labrador to British Columbia, south to Massachusetts, New York, Michigan and in the Rocky Mountains to Colorado and Utah. Also in Europe and Asia. The characteristic growth in a depressed circular patch gives the plant a very different aspect from the true Juniper. April–May.

3. Juniperus Virginiàna L. Red Cedar. Savin. (Fig. 133.)

Juniperus Virginiana L. Sp. Pl. 1039. 1753.

A tree, reaching a maximum height of about 100° and a trunk diameter of 5°, conic when young, but the branches spreading in age so that the outline becomes nearly cylindric. Leaves mostly opposite, all those of young plants and commonly some of those on the older twigs of older trees subulate, spiny-tipped, 2″–4″ long, those of the mature foliage scale-like, acute or subacute, closely appressed and imbricated, 4-ranked, causing the twigs to appear quadrangular; aments terminal; berry-like cones light blue, glaucous, about 3″ in diameter, borne on straight peduncle-like branchlets of less than their own length, 1–2-seeded.

In dry soil, New Brunswick to British Columbia, south to Florida, Texas, northern Mexico and Arizona. Also in the West Indies. Ascends to 2100 ft. in Virginia. Wood soft, not strong, straight-grained, compact, odorous, red, the sap-wood white; weight per cubic foot 31 lbs.; used in large quantities in the manufacture of lead pencils. April–May. Fruit ripe Sept.–Oct.

4. Juniperus Sabìna L. Shrubby Red Cedar. (Fig. 134.)

Juniperus Sabina L. Sp. Pl. 1039. 1753.
Juniperus Sabina var. *procumbens* Pursh, Fl. Am. Sept. 647. 1814.

A depressed, usually procumbent shrub, seldom more than 4° high. Leaves similar to those of the preceding species, those of young plants and the older twigs of older plants subulate, spiny-tipped, those of the mature foliage scale-like, appressed, 4-ranked, acute or acuminate; aments terminal; berry-like cones light blue, somewhat glaucous, 4″–5″ in diameter, borne on recurved peduncle-like branchlets of less than their own length, 1–4-seeded.

On banks, Nova Scotia to British Columbia, south to Maine, northern New York, Minnesota and Montana. Also in Europe and Asia. April–May.

Family 2. **TAXACEAE** Lindl. Nat. Syst. Ed. 2, 316. 1836.

Trees or shrubs, resin-bearing except *Taxus*. Leaves evergreen or deciduous, linear, or in several exotic genera broad or sometimes fan-shaped, the pollen-sacs and ovules borne in separate clusters or solitary. Perianth wanting. Stamens much as in the Pinaceae. Ovules with either one or two integuments; when two, the outer one fleshy, when only one, its outer part fleshy. Fruit drupe-like or rarely a cone.

About 8 genera and 75 species, of wide geographic distribution, most numerous in the southern hemisphere. The Maiden-hair Tree, *Ginkgo biloba*, of China and Japan, with fan-shaped leaves, is an interesting member of the group, now much planted for ornament.

1. TÁXUS L. Sp. Pl. 1040. 1753.

Evergreen trees or shrubs, with spirally arranged short-petioled linear flat mucronate leaves, spreading so as to appear 2-ranked, and axillary and solitary, sessile or subsessile very small aments; staminate aments consisting of a few scaly bracts and 5–8 stamens, their filaments united to the middle; anthers 4–6-celled. Ovules solitary, axillary, erect, subtended by a fleshy, annular disk, which is bracted at the base. Fruit consisting of the fleshy disk which becomes cup-shaped, red, and nearly encloses the bony seed. [Name ancient.]

About 6 species, natives of the north temperate zone. Besides the following, another occurs in Florida, one in Mexico and one on the Pacific Coast.

1. Taxus minor (Michx.) Britton. American Yew. Ground Hemlock. (Fig. 135.)

Taxus baccata var. *minor* Michx. Fl. Bor. Am. 2: 245. 1803.

Taxus Canadensis Willd. Sp. Pl. 4: 856. 1806.

Taxus minor Britton, Mem. Torr. Club, 5: 19. 1893.

A low straggling shrub, seldom over 5° high. Leaves dark green on both sides, narrowly linear, mucronate at the apex, narrowed at the base, 6″–10″ long, nearly 1″ wide, persistent on the twigs in drying; the staminate aments globose, 1″ long, usually numerous; ovules usually few; fruit red and pulpy, resinous, oblong, nearly 3″ high, the top of the seed not covered by the fleshy integument.

In woods, Newfoundland to Manitoba, south to New Jersey, in the Alleghenies to Virginia, and to Minnesota and Iowa. Ascends to 2500 ft. in the Adirondacks. April–May. Very different from the European Yew, *T. baccata*, in habit, the latter becoming a large forest tree, as does the Oregon Yew, *T. brevifolia*.

Class 2. *ANGIOSPÈRMAE.*

Ovules (macrosporanges) enclosed in a cavity (the ovary) formed by the infolding and uniting of the margins of a modified rudimentary leaf (carpel), or of several such leaves joined together, in which the seeds are ripened. The pollen-grains (microspores) on alighting upon the summit of the carpel (stigma) germinate, sending out a pollen-tube which penetrates its tissues and reaching an ovule enters the orifice of the latter (micropyle), and its tip coming in

contact with a germ-cell in the embryo-sac, fertilization is effected. In a few cases the pollen-tube enters the ovule at the chalaza, not at the micropyle.

There are two sub-classes, distinguished as follows:

Cotyledon one; stem endogenous.	Sub-class 1. MONOCOTYLEDONES.
Cotyledons two; stem (with rare exceptions) exogenous.	Sub-class 2. DICOTYLEDONES.

Sub-class 1. *MONOCOTYLÉDONES.*

Embryo of the seed with but a single cotyledon and the first leaves of the germinating plantlet alternate. Stem composed of a ground-mass of soft tissue (parenchyma) in which bundles of wood-cells are irregularly imbedded; no distinction into wood, pith and bark. Leaves usually parallel-veined, mostly alternate and entire, commonly sheathing the stem at the base and often with no distinction of blade and petiole. Flowers mostly 3-merous or 6-merous.

Monocotyledonous plants are first definitely known in Triassic time. They constitute between one-fourth and one-third of the living angiospermous flora. The families are grouped in about 10 orders (see Introduction).

Family 1. **TYPHÀCEAE** J. St. Hil. Expos. Fam. 1: 60. 1805.*

CAT-TAIL FAMILY.

Marsh or aquatic plants with creeping rootstocks, fibrous roots and glabrous erect, terete stems. Leaves linear, flat, ensiform, striate, sheathing at the base. Flowers monoecious, densely crowded in terminal spikes, which are subtended by spathaceous, usually fugacious bracts, and divided at intervals by smaller bracts, which are caducous, the staminate spikes uppermost. Perianth of bristles. Stamens 2–7, the filaments connate. Ovary 1, stipitate, 1–2-celled. Ovules anatropous. Styles as many as the cells of the ovary. Mingled among the stamens and pistils are bristly hairs, and among the pistillate flowers many sterile flowers with clavate tips. Fruit nutlike. Endosperm copious.

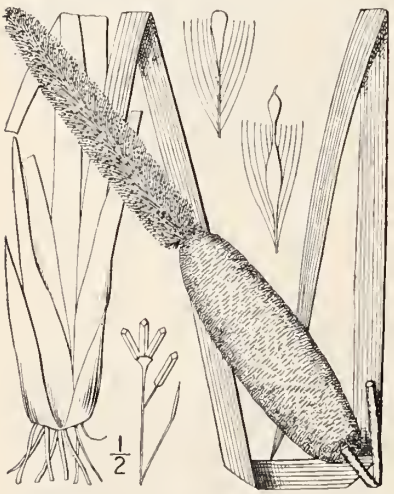
The family comprises only the following genus:

1. **TYPHA** L. Sp. Pl. 971. 1753.

Characters of the family. [Name ancient.]

About 10 species, widely distributed in temperate and tropical regions. Besides those here described, another occurs in California.

Spikes dark brown or black, the pistillate and staminate usually contiguous, the former without bractlets; stigmas spatulate or rhomboid; pollen 4-grained. 1. *T. latifolia.*
Spikes light brown, the pistillate and staminate usually distant, the former with bractlets; stigmas linear; pollen in simple grains. 2. *T. angustifolia.*



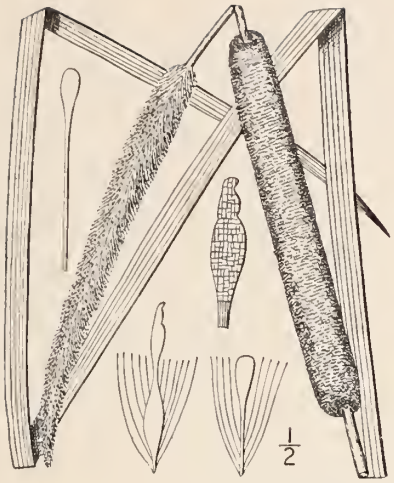
1. Typha latifòlia L. Broad-leaved Cat-tail. (Fig. 136.)

Typha latifolia L. Sp. Pl. 971. 1753.

Stems stout, 4°–8° high. Leaves 3″–12″ broad; spikes dark brown or black, the staminate and pistillate portions usually contiguous, each 3′–12′ long and often 1′ or more in diameter, the pistillate without bractlets; stigmas rhomboid or spatulate; pollen-grains in 4's; fruit furrowed, bursting in water; seeds with a separable outer coat.

In marshes, throughout North America except the extreme north. Ascends to 1600 ft. in the Adirondacks and to 2200 ft. in Virginia. Also in Europe and Asia. June–July. Fruit, Aug.–Sept.

* Text contributed by the late Rev. THOMAS MORONG.



2. **Typha angustifòlia** L. Narrow-leaved Cat-tail. (Fig. 137.)

Typha angustifolia L. Sp. Pl. 971. 1753.

Stems slender, 5°–10° high. Leaves mostly narrower than those of the preceding species, 2″–6″ wide; spikes light brown, the staminate and pistillate portions usually distant, the two together sometimes 15′ long, the pistillate, when mature, 2″–8″ in diameter, and provided with bractlets; stigmas linear or linear-oblong; pollen-grains simple; fruit not furrowed, not bursting in water; outer coat of the seed not separable.

Abundant in marshes along the Atlantic Coast from Nova Scotia to Florida and Cuba, but also occurring rather rarely inland. Also in Europe and Asia. June–July. Fruit, Aug.–Sept.

Family 2. **SPARGANIÀCEAE** Agardh, Theor. Syst. Pl. 13. 1858.*

BUR-REED FAMILY.

Marsh or pond plants with creeping rootstocks and fibrous roots, erect or floating simple or branched stems, and linear alternate leaves, sheathing at the base. Flowers monoecious, densely crowded in globose heads at the upper part of the stem and branches, the staminate heads uppermost, sessile or peduncled. Spathes linear, immediately beneath or at a distance below the head. Perianth of a few irregular chaffy scales. Stamens commonly 5, their filaments distinct; anthers oblong or cuneate. Ovary sessile, mostly 1-celled. Ovules anatropous. Fruit mostly 1-celled, nutlike. Embryo nearly straight, in copious endosperm.

The family comprises only the following genus.

1. **SPARGÀNIUM** L. Sp. Pl. 971. 1753.

Characters of the family. [Greek, referring to the ribbon-like leaves.]

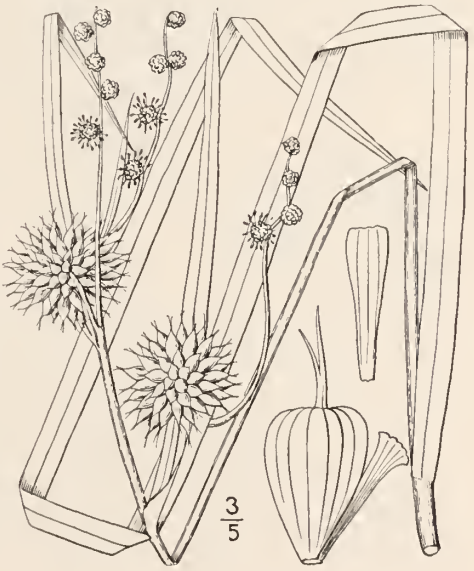
About 10 species, of temperate and cold regions. Besides the following, one occurs in California.

Fruit sessile. 1. *S. eurycarpum.*
Fruit stalked.
  Inflorescence branching. 2. *S. androcladum.*
  Inflorescence simple.
    Staminate heads 4–6, pistillate 2–6, 5″–8″ in diameter. 3. *S. simplex.*
    Staminate heads 1–2, pistillate 1–3, 2″–5″ in diameter. 4. *S. minimum.*

1. **Sparganium eurycárpum** Engelm. Broad-fruited Bur-reed. (Fig. 138.)

Sparganium eurycarpum Engelm. in A. Gray, Man. Ed. 2, 430. 1856.

Stems stout, 3°–8° high, branching. Leaves linear, flat, slightly keeled beneath, the lowest 3°–5° long, the upper shorter; staminate heads numerous; pistillate heads 2–4 on the stem or branch, sessile or more commonly peduncled, hard, compact and 10″–16″ in diameter when mature; style 1; stigmas 1–2; nutlets sessile, 3″–5″ long, obtusely 4–5-angled, narrowed at the base, the top rounded, flattened or depressed, abruptly tipped with the style; scales as long or nearly as long as the fruit and as many as its angles, often with 2 or 3 other exterior ones, somewhat spatulate, the apex rounded, denticulate or eroded.



In marshes and along streams, Newfoundland to British Columbia, south to Virginia, Missouri, Utah and California. Ascends to 2100 ft. in Virginia. May–Aug.

*Text contributed by the late Rev. THOMAS MORONG.

2. Sparganium andrócladum (Engelm.) Morong. Branching Bur-reed. (Fig. 139.)

Sparganium simplex var. *androcladum* Engelm. in A. Gray, Man. Ed. 5, 481. 1867.
Sparganium androcladum Morong, Bull. Torr. Club, 15: 78. 1888.

Stem slender, more or less branching, 10′–2° high. Pistillate heads 3–7, sessile or the lowest peduncled, axillary or the peduncles and branches axillary; style 1; stigma 1 (rarely 2); fruiting heads 6″–12″ in diameter; nutlets fusiform, 2″–3″ long, 1½″ thick, usually even, often strongly contracted at the middle, tapering into the style; scales oblong, as long as the nutlets or shorter, the exterior ones narrower; stalk of fruit 1″ long or more.

In bogs or shallow water, Nova Scotia to Ontario and British Columbia, south to Florida and Louisiana. June–Aug.

Sparganium andrócladum flúctuans Morong, Bull. Torr. Club, 15: 78. 1888.
Sparganium simplex var. *fluitans* Engelm. in A. Gray, Man. Ed. 5, 481. 1867. Not *Sparganium fluitans* Fries.

Floating in deep water with long slender stems, and thin leaves 1″–3½″ wide; inflorescence usually sparingly branched; fruiting heads 4″–6″ in diameter. In cold ponds, New Brunswick to Pennsylvania.

3. Sparganium símplex Huds. Simple-stemmed Bur-reed. (Fig. 140.)

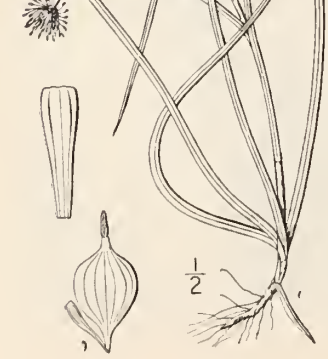
Sparganium simplex Huds. Fl. Angl. Ed. 2, 401. 1788.

Stem slender, 1½′–24′ high, simple. Leaves more or less triquetrous, 2″–4″ wide; inflorescence 10″–8′ long; staminate heads 4–6; pistillate 2–6, sessile or the lowest peduncled; fruiting heads 5″–8″ in diameter; nutlets fusiform or narrowly oblong, obtusely angled at the apex, more or less contracted in the middle, smaller than those of the preceding species and more tapering at the summit; scales denticulate, about one-half as long as the nutlets; stigma linear, as long as the style or shorter, rarely 2; stalk of fruit about 1″ long.

Borders of ponds and streams, Newfoundland to British Columbia, south to Pennsylvania, Montana and California. Ascends to 2500 ft. in the Catskill Mountains. June–Aug.

Sparganium simplex angustifòlium (Michx.) Engelm. in A. Gray, Man. Ed. 5, 481. 1867.
Sparganium angustifolium Michx. Fl. Bor. Am. 2: 189. 1803.

Floating in deep water. Leaves very long, ½″–1½″ wide, their sheaths often inflated at the base; staminate and pistillate heads 1–4; fruiting heads 3″–7″ in diameter. In mountain lakes and slow streams, Newfoundland to Oregon, south to New York and California.



4. Sparganium mínimum Fries. Small Bur-reed. (Fig. 141.)

Sparganium minimum Fries, Sum. Veg. 2: 560. 1846.

Floating, stems very slender, 4′–3° long. Leaves thin and lax, ½″–2½″ wide; inflorescence 1′ or more long; staminate heads 1–2; pistillate, 1–3, sessile, axillary, supra-axillary or the lowest on an axillary peduncle; ripe fruiting heads 2″–5″ in diameter; nutlets ovoid, slightly triangular, tapering abruptly into the style, 1″–2″ long, twice as long as the denticulate scales; stigma oval, often oblique, about as long as the style; stalk of the nutlet ¼″–½″ long, often apparently none.

In ponds and streams, New Brunswick to Manitoba and Oregon, south to New Jersey, Michigan and Utah. Also in northern Europe. Dwarf forms, growing out of water, sometimes occur with stems 3′–6′ high. June–Aug.

Family 3. **NAIADÀCEAE** Lindl. Nat. Syst. Ed. 2, 366. 1836.

Immersed aquatic plants with slender, often branching, leafy stems, the leaves flat or filiform, and perfect, monoecious or dioecious spicate axillary or spadiceous flowers. Perianth of 4 segments, or a hyaline envelope, or wanting. Stamens 1–4 or occasionally more, distinct and hypogynous in the perfect flowers, solitary or connate in the sterile. Anthers extrorse, 1–2-celled. Ovaries 1–9, mostly distinct, 1-celled, mostly 1-ovuled. Carpels rarely dehiscent. Seeds straight or curved. Endosperm none.

About 10 genera and 100 species of wide geographic distribution, most abundant in temperate regions. The months noted in the descriptions indicate the fruiting period.

Flowers perfect.
- Perianth of 4 distinct segments. — 1. *Potamogeton.*
- Perianth none; flowers naked. — 2. *Ruppia.*

Flowers monoecious or dioecious.
- Leaves entire.
  - Leaves 1-nerved, 1′–3′ long, ¼″ or less wide. — 3. *Zannichellia.*
  - Leaves many-nerved, 1°–5° long, 1″–4″ wide. — 4. *Zostera.*
- Leaves spiny-toothed on the margins. — 5. *Naias.*

1. **POTAMOGÈTON** L. Sp. Pl. 126. 1753.

Leaves alternate or the uppermost opposite, often of 2 kinds, submerged and floating, the submerged mostly linear, the floating coriaceous, lanceolate, ovate or oval. Spathes stipular, often ligulate, free or connate with the base of the leaf or petiole, enclosing the young buds and usually soon perishing after expanding. Peduncles axillary, usually emersed. Flowers small, spicate, green or red. Perianth-segments 4, short-clawed (Fig. 154), concave, valvate. Stamens 4, inserted on the claws of the perianth-segments. Anthers sessile. Ovaries 4, sessile, distinct, 1-celled, 1-ovuled, attenuated into a short erect or recurved style, or with a sessile stigma. Fruit of 4 ovoid or subglobose drupelets, the pericarp usually thin and hard or spongy. Seeds crustaceous, campylotropous, with an uncinate embryo thickened at the radicular end. [Greek, in allusion to the aquatic habitat.]

About 65 well-defined species, natives of temperate regions. Besides the following, 3 others occur in the southern parts of North America.

Stipules axillary and free from the leaf.
- With floating and submerged leaves.
  - Submerged leaves bladeless.
    - Nutlets more or less pitted. — 1. *P. natans.*
    - Nutlets not pitted. — 2. *P. Oakesianus.*
  - Submerged leaves with a proper blade.
    - Submerged leaves of 2 kinds, lanceolate and oval or oblong.
      - Uppermost broadly oval or elliptical, lowest lanceolate. — 3. *P. amplifolius.*
      - Uppermost lanceolate and pellucid, lowest oblong and opaque. — 4. *P. pulcher.*
    - Submerged leaves all alike, capillary or linear-setaceous.
      - 1-nerved or nerveless. — 25. *P. Vaseyi.*
      - 3-nerved. — 26. *P. lateralis.*
    - Submerged leaves all alike, linear.
      - Nearly the same breadth throughout, obtusely pointed, coarsely cellular-reticulated in the middle. — 5. *P. Nuttallii.*
      - Broader at base, acute, without cellular-reticulation. — 9. *P. heterophyllus.*
    - Submerged leaves all alike, lanceolate.
      - Uppermost leaves petioled, lowest sessile. — 6. *P. alpinus.*
      - All the leaves petioled.
        - Floating leaves large, broadly elliptic, rounded or subcordate at base. — 11. *P. Illinoensis.*
        - Floating leaves narrowly elliptical, tapering at base. — 7. *P. lonchites.*
        - Floating leaves mostly obovate or oblanceolate, tapering at base. — 8. *P. Faxoni.*
      - All the leaves sessile or subsessile.
        - Fruit only 1 line long, obscurely 3-keeled. — 10. *P. spathulaeformis.*
        - Fruit 1½ lines long, distinctly 3-keeled. — 12. *P. Zizii.*
- With submerged leaves only.
  - Without propagating buds and without glands.
    - Leaves with broad blades, mostly lanceolate or ovate, many-nerved.
      - Leaves subsessile or short-petioled, mostly acute or cuspidate. — 13. *P. lucens.*
      - Leaves semi-amplexicaul, obtuse and cucullate at the apex. — 14. *P. praelongus.*
      - Leaves meeting around the stem, very obtuse at the apex, not cucullate. — 15. *P. perfoliatus.*
    - Leaves with narrow blades, linear or oblong-linear, several-nerved.
      - Leaves oblong-linear, 5–7-nerved, obtuse at the apex. — 16. *P. Mysticus.*
      - Leaves narrowly linear, 3-nerved, acute at the apex. — 21. *P. foliosus.*
    - Leaves with narrow blades, capillary or setaceous, 1-nerved or nerveless. — 17. *P. confervoides.*

*Text contributed by the late Rev. THOMAS MORONG.

With propagating buds or glands, or both.
With buds, but without glands.
Leaves serrulate, 3–7-nerved. 18. *P. crispus.*
Leaves entire, with 3 principal and many fine nerves. 19. *P. zosteraefolius.*
Commonly with glands, but no buds.
Stems long-branching from the base; leaves lax, flat, 3-nerved, abruptly acute or cuspidate. 20. *P. Hillii.*
Stems simple; leaves strict, revolute, 3–5-nerved, acuminate. 24. *P. rutilus.*
With both buds and glands.
Glands large and translucent; buds rare. 22. *P. obtusifolius.*
Glands small, often dull; buds common.
Leaves linear, 5–7-nerved. 23. *P. Friesii.*
Leaves linear, 3-nerved. 27. *P. pusillus.*
Leaves capillary, 1-nerved or nerveless. 28. *P. gemmiparus.*
Stipules adnate to the leaves or petioles.
With both floating and submerged leaves.
Submerged peduncles as long as the spikes, clavate, often recurved. 29. *P. diversifolius.*
Submerged peduncles none, or at most hardly a line long. 30. *P. Spirillus.*
With submerged leaves only.
Stigma broad and sessile. 31. *P. filiformis.*
Style apparent; stigma capitate.
Fruit without keels or obscurely keeled. 32. *P. pectinatus.*
Fruit strongly 3-keeled.
Leaves entire, 3–5-nerved. 33. *P. interruptus.*
Leaves minutely serrulate, finely many-nerved. 34. *P. Robbinsii.*

1. Potamogeton nàtans L. Common Floating Pondweed. (Fig. 142.)

Potamogeton natans L. Sp. Pl. 126. 1753.

Stems 2°–4° long, simple or sparingly branched. Floating leaves thick, the blade ovate, oval or elliptic, 2′–4′ long, 1′–2′ wide, usually tipped with a short abrupt point, rounded or subcordate at the base, many-nerved; submerged leaves reduced to phyllodes or bladeless petioles which commonly perish early and are seldom seen at the fruiting period; stipules sometimes 4′ long, acute, 2-keeled; peduncles as thick as the stem, 2′–4′ long; spikes cylindric, very dense, about 2′ long; fruit turgid, 2″–2¼″ long, about 1¼″ thick, scarcely keeled, narrowly obovoid, slightly curved on the face; style broad and facial; nutlet hard, more or less pitted or impressed on the sides, 2-grooved on the back; embryo forming an incomplete circle, the apex pointing toward the base.

In ponds and streams, throughout North America except the extreme north, extending into Mexico. Also in Europe and Asia. July–Aug.

2. Potamogeton Oakesiànus Robbins. Oakes' Pondweed. (Fig. 143.)

Potamogeton Oakesianus Robbins in A. Gray, Man. Ed. 5, 485. 1867.

Stems very slender, often much branched from below. Floating leaves elliptic, mostly obtuse, rounded or slightly subcordate at the base, 1′–2′ long, 5″–9″ wide, 12–20-nerved; petioles 2′–6′ long; submerged leaves mere capillary phyllodes, often persistent through the flowering season; peduncles 1′–3′ long, commonly much thicker than the stem, mostly solitary; spikes cylindric, ½′–1′ long; stipules acute, hardly keeled; fruit obovoid, about 1½″ long, 1″ thick, nearly straight on the face, 3-keeled, the middle keel sharp; style apical or subapical; sides of the nutlet not pitted, but sometimes slightly impressed; embryo circle incomplete, the apex pointing toward the base.

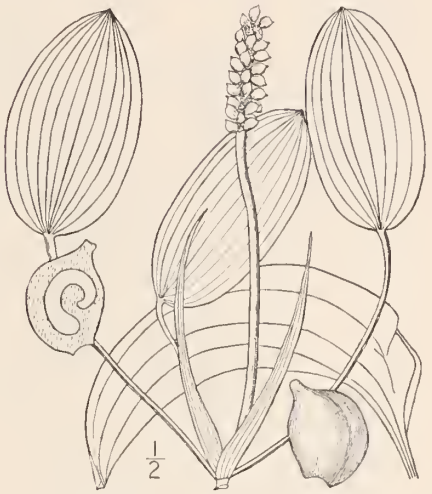
In still water, Anticosti to northern Pennsylvania and New Jersey. Summer.

3. Potamogeton amplifòlius Tuckerm. Large-leaved Pondweed. (Fig. 144.)

Potamogeton amplifolius Tuckerm. Am. Journ. Sci. (II.) 6: 225. 1848.

Stems long, simple or occasionally branched. Floating leaves oval or ovate, abruptly pointed at the apex, rounded at the base, 2′–4′ long, 1¼′–2′ wide, many-nerved; petioles 3′–5′ long; submerged leaves mostly petioled, large, the uppermost often elliptic or oval, 3′–6′ long, 1′–2½′ wide, the lowest lanceolate, often 8′ long, with about 25 nerves, often with the sides of the blade closed and assuming a falcate shape; stipules tapering to a long sharp point, sometimes 4′ long; peduncles thickened upward, 2′–8′ long; spikes cylindric, 1′–2′ long; fruit 2″–2½″ long, 1¼″ thick, turgid, the pericarp hard, obliquely obovoid, 3-keeled; face more or less angled; style subapical; embryo slightly incurved.

In lakes, Ontario to British Columbia, south to Connecticut, Kentucky and Nebraska. July-Sept.



4. Potamogeton púlcher Tuckerm. Spotted Pondweed. (Fig. 145.)

Potamogeton pulcher Tuckerm. Am. Journ. Sci. 45: 38. 1843.

Stems simple, terete, black-spotted, 1°–2° long. Floating leaves usually massed at the top on short lateral branches, alternate, ovate or round-ovate, subcordate, 2′–4½′ long, 9″–3¼″ wide, many-nerved; peduncles about as thick as the stem, 2′–4′ long, spotted; submerged leaves of 2 kinds, the uppermost pellucid, lanceolate, long-acuminate, undulate, 3′–8′ long, 6″–18″ wide, tapering at the base into a short petiole, 10–20-nerved; the lowest much thicker, opaque, spatulate, oblong or ovate, on petioles ¼′–4′ long; stipules obtuse or acuminate, 2-carinate; fruit 2″–2¼″ long, 1½″ thick, turgid, tapering into a stout apical style, the back sharply 3-keeled; face angled near the middle, with a sinus below; embryo coiled.

In ponds and pools, Maine to Georgia and Missouri. July.

5. Potamogeton Nuttállii Cham. & Sch. Nuttall's Pondweed. (Fig. 146.)

Potamogeton Nuttallii Cham. & Sch. Linnaea, 2: 226. *pl. 6. f. 25.* 1827.
Potamogeton Claytonii Tuckerm. Am. Journ. Sci. 45: 38. 1843.

Stems slender, compressed, mostly simple, 1°–6° long. Floating leaves opposite, elliptic, sometimes obovate, obtuse at the apex, short-petioled, 1½′–3½′ long, 4″–12″ wide, many-nerved; submerged leaves linear, 2-ranked, 2′–7′ long, 1″–3″ wide, 5-nerved, the 2 outer nerves nearly marginal, the space between the 2 inner and the midrib coarsely reticulated; stipules obtuse, hyaline, not keeled; peduncles 1′–5′ long; spikes ½′–1′ long; fruit round-obovoid 1¼″–2″ long, 1″–1½″ thick, 3-keeled, the sides flat and indistinctly impressed; style short, apical; embryo coiled one and one-third times.

In ponds and streams, Nova Scotia to Pennsylvania and South Carolina. June–Aug.

6. Potamogeton alpinus Balbis. Northern Pondweed. (Fig. 147.)

Potamogeton alpinus Balbis, Misc. Bot. 13. 1804.
Potamogeton rufescens Schrad.; Cham. Adn. Fl. Ber. 4. 1815.

Plant of a ruddy tinge, stems simple or branched, somewhat compressed. Floating leaves spatulate or oblanceolate, obtuse, many-nerved, tapering into petioles 1′–5′ long; submerged leaves semi-pellucid, the lowest sessile, the uppermost petioled, oblong-linear or linear-lanceolate, obtuse or rarely acute, narrowed at the base, 3′–12′ long, 2″–9″ wide, 7–17-nerved; stipules broad, faintly 2-carinate, obtuse or rarely acute; peduncles 2′–8′ long; spikes 1′–1½′ long; fruit obovoid, lenticular, reddish, 1¼″ long, 1″ thick, 3-keeled, the middle keel sharp, the face arched, beaked by the short recurved style; apex of the embryo pointing directly to the basal end.

In ponds, Nova Scotia to British Columbia, New Jersey and California. Also in Europe. July–Aug.

7. Potamogeton lonchites Tuckerm. Long-leaved Pondweed. (Fig. 148.)

Potamogeton fluitans Roth, Fl. Germ. 1: 72. 1788?
Potamogeton lonchites Tuckerm. Am. Journ. Sci. (II.) 6: 226. 1848.

Stem terete, much branched, 3°–6° long. Floating leaves rather thin, elliptic, pointed at both ends, 2′–6′ long, 6″–14″ wide, many-nerved, on petioles 2′–8′ in length; submerged leaves pellucid, 4′–13′ long, 2″–12″ wide, rounded at the base or tapering into a petiole 1′–4′ long; stipules 1′–4′ long, acuminate, acute or obtuse, strongly or faintly 2-carinate; peduncles thickening upward, 2′–3′ long; spikes cylindric, 1′–2′ long; fruit about 2″ long, 1″–1½″ thick, obliquely obovoid, the face nearly straight, the back 3-keeled, the middle keel rounded or often with a projecting wing under the style, not impressed on the sides; embryo slightly incurved, apex pointing slightly inside of the base.

In ponds and slow streams, New Brunswick to Washington, south to Florida and California. July–Oct.

Potamogeton lonchites Noveboracénsis Morong, Mem. Torr. Club, 3: Part 2, 20. 1893.

Floating leaves thicker, 3′–5½′ long, about 2′ wide, 20–24-nerved, abruptly pointed or obtuse at the apex; peduncles sometimes 4′–5′ and spikes 3′ long. Lakes of central New York.

8. Potamogeton Fáxoni Morong. Faxon's Pondweed. (Fig. 149.)

Potamogeton Faxoni Morong, Mem. Torr. Club, 3: Part 2, 22. 1893.

Floating leaves numerous, mostly obovate or oblanceolate, blunt-pointed or obtuse at the apex, narrowed at the base, often strikingly like those of *P. spathulaeformis*, 2′–3½′ long, 8″–12″ wide, 13–17-nerved, on petioles 2′–6′ long; submerged leaves oblong-lanceolate, acute or sometimes obtuse, 3′–5′ long, 6″–12″ wide, 5–13-nerved, often with an irregular areolation on each side of the midrib, borne on petioles ½′–2′ in length; peduncles slightly thicker than the stem, 2′–5′ long; spikes dense, 1′–2′ long; fruit not collected.

Little Otter Creek and Lake Champlain, Ferrisburg, Vermont.

9. Potamogeton heterophýllus Schreb. Various-leaved Pondweed. (Fig. 150.)

Potamogeton heterophyllus Schreb. Spicil. Fl. Lips. 21. 1771.
Potamogeton heterophyllus var. *maximus* Morong, Mem. Torr. Club, 3: Part 2, 25. 1893.
Potamogeton heterophyllus var. *longipedunculatus* Morong, Mem. Torr. Club, 3: Part 2, 24. 1893.

Stems slender, compressed, much branched, sometimes 12° long. Floating leaves pointed at the apex, rounded or subcordate at the base, 8″–4′ long, 4″–14″ wide, 10–18-nerved, on petioles 1′–4′ long; submerged leaves pellucid, sessile, linear-lanceolate, acuminate or cuspidate, rather stiff, 1′–6½′ long, 1″–8″ wide, 3–9-nerved, the uppermost often petioled; peduncles often thickened upward, 1′–7′ long, sometimes clustered, stipules spreading, obtuse, 8″–12″ long; spikes 9″–1¼′ long; fruit roundish or obliquely obovoid, 1″–1½″ long, ½″–1″ thick, indistinctly 3-keeled; style short, obtuse, apical; apex of the embryo nearly touching the base, pointing slightly inside of it.

A very variable species, occurring in different forms throughout almost all North America except the extreme north. Also in Europe. July–Sept.

Potamogeton heterophýllus graminifólius (Fries) Morong, Mem. Torr. Club, 3: Part 2, 24. 1893.
Potamogeton gramineus var. *graminifolius* Fries, Novit. Ed. 2, 36. 1828.
Submerged leaves delicate, flaccid, linear, 2′–5′ long, 1″–3″ wide. With the type.

Potamogeton heterophýllus myriophýllus (Robbins) Morong, Mem. Torr. Club, 3: Part 2, 24. 1893.
Potamogeton gramineus var. *myriophyllus* Robbins in A. Gray, Man. Ed. 5, 487. 1867.
Stems dichotomously branching, very leafy; submerged leaves delicate, about 1′ long and 2″ wide, 3–5-nerved, linear or the upper oblanceolate; floating leaves elliptic or lanceolate-oblong; rootstock tuberous. Massachusetts, Rhode Island and Connecticut.

Potamogeton heterophýllus minimus Morong, Mem. Torr. Club, 3: Part 2, 25. 1893.
Stems long and almost capillary, the internodes 3′–4′ long; submerged leaves densely clustered on short lateral branches, ½′–1′ long, scarcely ¼″ wide, acuminate, 1-nerved; floating leaves ½′–1½′ long, 3″–9″ wide, lanceolate, oval or ovate, usually clustered at the summit of the stem. Massachusetts and New Hampshire.

10. Potamogeton spathulaefórmis (Robbins) Morong. Spatulate-leaved Pondweed. (Fig. 151.)

Potamogeton gramineus var. (?) *spathulaeformis* Robbins in A. Gray, Man. Ed. 5, 487. 1867.
Potamogeton spathulaeformis Morong, Mem. Torr. Club, 3: Part 2, 26. 1893.

Stems many, branched, 2°–3° long. Floating leaves obovate or elliptic, abruptly acute at the apex, rather thin, 13–23-nerved, 1′–2½′ long, 6″–13″ wide, borne on slender petioles; submerged leaves pellucid, spatulate-oblong or linear-lanceolate, 2′–4′ long, 3″–9″ wide, 5–13-nerved, cuspidate or spinescent, sessile or subsessile, often reduced to phyllodes with a very narrow blade and a long acumination at the base and apex; peduncles often thickening upward, 1′–2′ long; stipules obtuse, faintly keeled, the apex slightly hooded; spikes large; fruit about 1″ long, roundish or obliquely ovoid, obscurely 3-keeled, with a curved or slightly angled face; embryo with the apex pointing slightly inside of the base.

In Mystic Pond, Medford, Mass. Also in Europe. Summer.

11. Potamogeton Illinoénsis Morong. Illinois Pondweed. (Fig. 152.)

Potamogeton Illinoensis Morong, Coult. Bot. Gaz. 5: 50. 1880.

Stem stout, much branched above. Floating leaves opposite, numerous, thick, 4′–5½′ long, 2′–3½′ wide, many-nerved, oval or broadly elliptic, short-pointed at the apex, rounded, subcordate or narrowed at the base; petioles 1′–4′ long; submerged leaves numerous, 4′–8′ long, 1′–2′ wide, 13–19-nerved, acuminate or the uppermost acute, mostly tapering at the base into a short broad flat petiole, rarely reduced to phyllodes; stipules 2′–3′ long, obtuse, strongly 2-carinate; peduncles 2′–4′ long; spikes 1′–2′ long; fruit roundish or obovoid, 1½″–2″ long, 1″–1½″ thick, dorsally 3-keeled; style short, blunt.

In ponds, Illinois to Iowa and Minnesota. Aug.

12. Potamogeton Zízii Roth. Ziz's Pondweed. (Fig. 153.)

Potamogeton angustifolius Berch. & Presl, Rost. 19. 1821. Not DC. 1805.
Potamogeton Zizii Roth, Enum. 1: 531. 1827.

Stems slender, branching. Floating leaves elliptic, 1½′–4′ long, 6″–12″ wide, many-nerved; petioles mostly short; submerged leaves mostly lanceolate or oblanceolate, thin, acute or cuspidate, 2′–6′ long, 3″–15″ wide, 7–17-nerved; stipules 6″–18″ long, obtuse, 2-keeled; peduncles thicker than the stem, 2½′–6′ long; spikes 1′–2′ long; fruit obliquely obovoid, 1¼″–2″ long, about 1″ thick, the face dorsally 3-keeled; style short, blunt, facial; apex of the embryo pointing directly to the base.

In lakes and streams, Quebec to Montana, south to Florida and Wyoming. Also in Europe. July–Aug.

Potamogeton Zizii Methyénsis (A. Benn.) Morong. *Potamogeton angustifolius* var. *Methyensis* A. Bennett, Britten's Journ. Bot. 29: 151. 1891.

Middle leaves narrow; upper leaves oval; stipules long; fruit small. Methy Lake, Canada.

13. Potamogeton lùcens L. Shining Pondweed. (Fig. 154.)

Potamogeton lucens L. Sp. Pl. 126. 1753.

Stem thick, branching below and often with masses of short leafy branches at the summit. Leaves all submerged, elliptic, lanceolate or the uppermost oval, shining, acute or acuminate and cuspidate, or rounded at both ends and merely mucronulate, sessile or short-petioled, 2½′–8′ long, 8″–20″ wide, the tips often serrulate; stipules 1′–3′ long, 2-carinate, sometimes very broad; peduncles 3′–6′ long; spikes 2′–2½′ long, cylindric, very thick; fruit about 1½″ long and 1¼″ thick, rounded, the face usually with a slight inward curve at the base; apex of the embryo pointing transversely inward.

In ponds, Nova Scotia to Florida, west to California and Mexico. Local. Also in Europe. Sept.–Oct.

Potamogeton lùcens Connecticuténsis Robbins in A. Gray, Man. Ed. 5, 488. 1867.

Stems flexuous; leaves acuminate; fruit larger than that of the type (about 2″ long), distinctly 3-carinate and with a facial style. Saltonstall's Pond, Conn., and White Plains, N. Y.

14. Potamogeton praelóngus Wulf. White-stemmed Pondweed. (Fig. 155.)

Potamogeton praelongus Wulf. in Roem. Arch. 3: 331. 1805.

Stems white, flexuous, flattened, much branched, growing in deep water, sometimes 8° long. Leaves all submerged, oblong or oblong-lanceolate, semi-amplexicaul, bright green, 2′–12′ long, ½′–1¼′ wide, with 3–5 main nerves; stipules white, scarious, obtuse and commonly closely embracing the stem; peduncles 3′–20′ long, erect, straight, about as thick as the stem; spikes 1′–2′ long, thick, cylindric; fruit dark green, obliquely obovoid, 2″–2½″ long, 1½″–2″ thick, the back much rounded, often with the upper curve nearly as high as the style; the middle keel sharp; style short, obtuse, facial.

Nova Scotia to British Columbia, south to New Jersey, Minnesota and California. Also in Europe. Fruits in June and July, and usually withdraws its stems beneath the water as soon as the fruit is set.

15. Potamogeton perfoliàtus L. Clasping-leaved Pondweed. (Fig. 156.)

Potamogeton perfoliatus L. Sp. Pl. 126. 1753.

Stems slender, much branched. Leaves all submerged, orbicular or ovate, sometimes lanceolate, usually obtuse and minutely serrulate at the apex, cordate-perfoliate at the base, 5′–15′ long, 3″–12″ wide; peduncles 1¼′ long, usually erect or slightly spreading; spikes 8″–12″ long, often flowering and fruiting under water; fruit obliquely obovoid, 1¼″–1½″ long, 1″ thick, obscurely 3-carinate on the back, the face slightly curved outwardly toward the top, the sides with a shallow indentation which runs into the face; style nearly facial; embryo slightly incurved or with its apex pointing directly toward the base.

In ponds and streams, Newfoundland to British Columbia, south to Florida and California. Also in Europe and Asia. July–Sept.

Potamogeton perfoliàtus Richardsònii A. Bennett, Britten's Journ. Bot. 27: 25. 1889.

Potamogeton perfoliatus var. *lanceolatus* Robbins in A. Gray, Man. Ed. 5, 488. 1867. Not Blytt 1861.

Leaves 1′–4½′ long, 4″–8″ wide at the broadened amplexicaul base, often curving inward at the apex, 13–23-nerved. Fruit somewhat larger than that of the type, about 2″ long and 1¼″ thick. Lake Champlain to Oregon, south to Delaware, Nebraska and California.

16. Potamogeton Mýsticus Morong. Mystic Pond Pondweed. (Fig. 157.)

Potamogeton Mysticus Morong, Coult. Bot. Gaz. 5: 50. 1880.

Whole plant very slender and delicate, stems irregularly branching above, nearly filiform, terete, 1°–4° long. Leaves all submerged, scattered, oblong-linear, 1′–1½′ long, 1″–3″ wide, 5–7-nerved, obtuse and rarely with minute serrulations near the apex, abruptly narrowed at the base and sessile or partly clasping; stipules obtuse, about 6″ long, hyaline and with many fine nerves, mostly deciduous, but sometimes persistent and closely sheathing the stem; spikes few, capitate, 4–6-flowered, borne on erect peduncles 1′–2′ long; immature fruit obovoid, less than 1″ long, about ½″ wide, obscurely 3-keeled on the back, slightly beaked by the slender, recurved style.

Mystic Pond, Medford, and Miacount Pond, Nantucket, Mass. Aug–Sept.

17. Potamogeton confervoides Reichb. Alga-like Pondweed. (Fig. 158.)

Potamogeton confervoides Reichb. Ic. Fl. Germ. & Helv. 7: 13. 1845.
Potamogeton trichoides A. Gray, Man. 457. 1848. Not Cham.
Potamogeton Tuckermani Robbins; A. Gray, Man. Ed. 2, 434. 1856.

Stems slender, terete, much branched, the upper branches repeatedly forking, 6′–18′ long. Leaves very delicate, flat, setaceous, 1′–2½′ long, the broadest scarcely ¼″ wide, tapering to a long hair-like point, 1–3-nerved and often with a few cross-veins, bright green or yellowish; stipules delicate, obtuse, 2″–3″ long; peduncles 2′–8′ long, erect, somewhat thickened upward; spikes capitate, 3″–4″ long; fruit roundish-obovoid, 1″–1½″ long and about as thick, the back sometimes a little angular or sinuate, 3-keeled, the middle keel sharp, the face notched near the base, the sides impressed with a shallow indentation which runs into the notch of the face; apex of the embryo nearly touching the base a little to one side.

In cold or mountain ponds, Maine and New Hampshire to New Jersey and Pennsylvania. Also in Europe. Aug.–Sept.

18. Potamogeton crispus L. Curled-leaved Pondweed. (Fig. 159.)

Potamogeton crispus L. Sp. Pl. 126. 1753.

Stems branching, compressed. Leaves 2-ranked, linear-oblong or linear-oblanceolate, sessile or semi-amplexicaul, obtuse at the apex, serrulate, crisped, ½′–4′ long, 3″–7″ wide, 3–7-nerved, the midrib often compound and the outer nerves very near the margin; stipules small, scarious, obtuse, early perishing; peduncles 1′–2′ long, frequently recurved in fruit, sometimes very numerous; spikes about ½′ long, appearing very bristly with the long-beaked drupelets when in fruit; fruit ovoid, about 1½″ long, 1″ or more wide, 3-keeled on the back, the middle keel with a small projecting tooth near the base, the face slightly curved, the style facial and nearly as long as the drupelet; embryo small, its apex pointing directly toward its base. The plant is mainly propagated by peculiar winter buds.

In fresh, brackish or even salt water, Massachusetts to Pennsylvania and Virginia. Also in Europe. Aug.

19. Potamogeton zosteraefolius Schum. Eel-grass Pondweed. (Fig. 160.)

Potamogeton zosteraefolius Schum. Enum. Pl. Saell. 50. 1801.
Potamogeton compressus Fries, Novit. Ed. 2, 44. 1828. Not L. 1753.

Stems much flattened, sometimes winged, widely branching. Leaves linear, obtuse and mucronate or short-pointed at the apex, 2′–12′ long, 1″–2″ wide, with 3 principal nerves and many fine ones; stipules scarious, obtuse, finely nerved, soon perishing; peduncles 1½′–4′ long; spikes cylindric, about ½′ long, 12–15-flowered; fruit obovoid with a broad base, about 2″ long, 1¼″–1½″ thick, 3-keeled on the back, the lateral keels rather obscure; face arched, beaked with a short recurved style; embryo slightly incurved. The plant is propagated by the terminal leaf-buds, which sink to the bottom, and rest during the winter.

In still or running water, New Brunswick to New Jersey, west to Oregon. Also in Europe. July–Aug.

20. Potamogeton Hillii Morong. Hill's Pondweed. (Fig. 161.)

Potamogeton Hillii Morong, Coult. Bot. Gaz. 6: 290. 1881.

Stems slightly compressed, slender, widely branching, 1°–2° long. Leaves linear, acute or cuspidate, or often almost aristate, 1′–2¼′′ long, ½′′–1¼′′ wide, 3-nerved, the lateral nerves delicate and nearer the margins than the midrib; stipules whitish, many-nerved, obtuse, 3′′–5′′ long; peduncles about ½′ long, erect or slightly recurved, more or less clavate; spikes capitate, 3–6-fruited; fruit obliquely obovoid, obtuse at the base, about 2′′ long, 1′′–1¼′′ thick, 3-carinate on the back, the middle keel sharp and more or less undulate, flat on the sides, face slightly arched; style nearly facial, short; embryo coiled.

In ponds, eastern New York to Michigan. There are two forms of the species, the one 2-glandular at the base of the leaves, the other glandless. July–Sept.

21. Potamogeton foliòsus Raf. Leafy Pondweed. (Fig. 162.)

Potamogeton foliosus Raf. Med. Rep. (II.) 5: 354. 1808.

Potamogeton pauciflorus Pursh, Fl. Am. Sept. 121. 1814. Not Lam. 1789.

Stems flattened, much branched, 1°–3° long. Leaves 1′–2′ long, ½′′–1′′ wide, acute, 3-nerved, not glandular at the base; stipules white, hyaline, obtuse or sometimes acute, 6′′–10′′ long; peduncles more or less clavate, erect, about ½′ long; spikes about 4-flowered; fruit lenticular or nearly orbicular, about 1′′ in diameter, 3-keeled on the back, the middle keel winged, sinuate-dentate, often with projecting shoulders or teeth at each end, the face strongly angled or arched, sharp, often with a projecting tooth at the base; style apical.

In ponds and streams, New Brunswick to British Columbia, south to Florida, New Mexico and California. July–Aug.

Potamogeton foliòsus Niagarénsis (Tuckerm.) Morong, Mem. Torr. Club, 3: Part 2, 39. 1893.

Potamogeton Niagarensis Tuckerm. Am. Journ. Sci. (II.) 7: 354. 1849.

Larger. Stems 2°–3° long, leaves sometimes over 3′ in length and 1′′ wide, 3–5-nerved; stipules larger and occasionally acute; spikes 8–12-flowered. Niagara Falls to Michigan and California.

22. Potamogeton obtusifòlius Mert. & Koch. Blunt-leaved Pondweed. (Fig. 163.)

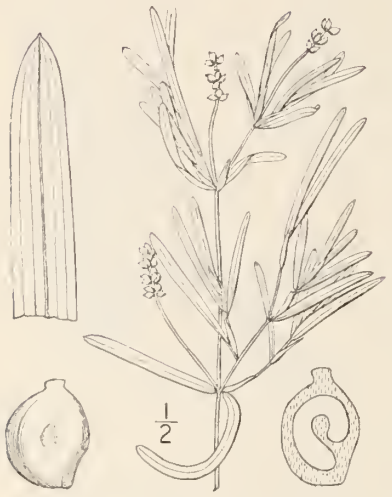
Potamogeton compressus Wahl. Fl. Suec. 1: 107. 1824. Not L. 1753.

Potamogeton obtusifolius Mert. & Koch, Deutsch. Fl. 1: 855. 1823.

Stems usually slender, compressed, widely branching, especially above. Leaves linear, 2′–3′ long, ½′′–2′′ wide, obtuse, often mucronate, usually 3-nerved with a broad midrib, sometimes 5–7-nerved, 2-glandular at the base, the glands large and translucent; stipules white or scarious, many-nerved, obtuse, 6′′–9′′ long, often as long as or longer than the internodes; peduncles numerous, 1′–1½′ long, slender, erect; spikes 3′′–4′′ long, ovoid, 5–8-flowered; fruit obliquely obovoid, about 1½′′ long and 1′′ thick, 3-keeled; style short, blunt, nearly facial.

In still water, Quebec to Pennsylvania, west to Minnesota and Wyoming. Also in Europe. July–Aug.

23. Potamogeton Friesii Ruprecht. Fries' Pondweed. (Fig. 164.)



Potamogeton compressus J. E. Smith, Engl. Bot. 3: *pl. 418.* 1794. Not L. 1753.
Potamogeton pusillus var. *major* Fries, Novit. Ed. 2, 48. 1828.
Potamogeton Friesii Ruprecht, Beitr. Pfl. Russ. Reichs, 4: 43. 1845.
Potamogeton major Morong, Mem. Torr. Club, 3: Part 2, 41. 1893. Not *P. pusillus* var. *major* M. & K. 1823.

Stems compressed, 2°–4° long, branching. Leaves 1½′–2½′ long, about 1″ wide, acute, obtuse or cuspidate at the apex, mostly 5-nerved, rarely 7-nerved, 2-glandular at the base, the glands small; stipules white, hyaline, finely nerved, obtuse or acute, 6″–12″ long; peduncles 1′–1½′ long, often thicker than the stem and sometimes thickening upward; spikes, when developed, interrupted; fruit quite similar to that of *P. pusillus*, but with a recurved style, usually with a shallow pit on the sides, and with the apex of the embryo pointing toward the basal end.

In still water, New Brunswick to New York, west to British Columbia. Also in Europe. Propagating buds occasional. July–Aug.

24. Potamogeton rùtilus Wolfg. Slender Pondweed. (Fig. 165.)

Potamogeton rutilus Wolfg.; R. & S. Mant. 3: 362. 1827.

Stems very slender, 8′–24′ long, compressed, simple or nearly so. Leaves 1′–1½′ long, ¼″–½″ wide, acute or acuminate, strict, nearly erect, 3–5-nerved, revolute, the nerves prominent beneath, often 2-glandular at base and bright green; stipules acute, 6″–10″ long, often longer than the internodes and hiding the bases of the leaves above, persistent, becoming white and fibrous with age; peduncles 6″–18″ long; spikes 3″–5″ long, usually dense, but sometimes interrupted; fruit obliquely obovoid, about 1″ long and ½″ thick, obscurely keeled or the back showing only 2 small grooves; apex of the drupelet tapering into a short facial nearly straight recurved style; embryo circle not complete, the apex pointing a little inside of the base.

Anticosti and James Bay to Michigan and Minnesota. Also in Europe. Propagating buds usually wanting.

25. Potamogeton Vàseyi Robbins. Vasey's Pondweed. (Fig. 166.)

Potamogeton Vaseyi Robbins in A. Gray, Man. Ed. 5, 485. 1867.
Potamogeton Vaseyi var. *latifolius* Morong, Mem. Torr. Club, 3: Part 2, 44. 1893.

Stems filiform, widely branching below, and with many short lateral branches above, 1°–1½° long, the emersed fertile forms in shallow water, and the more common sterile submerged forms in water from 6°–8° in depth. Floating leaves on the fertile stems only, coriaceous, in 1–4 opposite pairs, oval oblong or obovate, 4″–5″ long, 2″–3″ wide, with 5–9 nerves deeply impressed beneath, tapering at the base into petioles 3″–4″ long; submerged leaves capillary, 1′–1½′ long; stipules white, delicate, many-nerved, acute or obtuse, 2″–3″ long; peduncles 3″–6″ long, thickening in fruit; spikes 2″–3″ long, 2–6-fruited; fruit roundish-obovoid, about 1″ long and nearly as thick, 3-keeled, the middle keel rounded, tipped with a straight or recurved style.

Eastern Massachusetts to southern Ontario and Ohio. The plant is furnished with propagative buds. July–Aug.

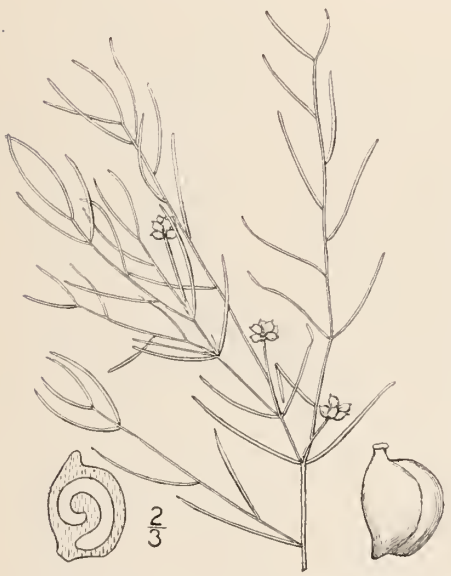
26. Potamogeton lateràlis Morong. Opposite-leaved Pondweed. (Fig. 167.)

Potamogeton lateralis Morong, Coult. Bot. Gaz. 5: 51. 1880.

Stems filiform, much branched. Floating leaves on sterile shoots only, coriaceous, elliptic, obtuse, 4″–5″ long, 1″–2″ wide, 5–7-nerved, the nerves deeply impressed beneath, usually in 1–3 opposite pairs which stand at right angles to the stem, on petioles 3″–10″ long; submerged leaves linear, acute, 1′–3′ long, ¼″–½″ wide, 1–3-nerved, 2-glandular at the base, but the glands small and often obsolete; stipules small, hyaline, many-nerved, obtuse, deciduous; peduncles and floating leaves lateral, with a peculiar appearance, widely spreading at maturity, sometimes recurved, thickening in fruit, 4″–15″ long; spikes capitate or often interrupted, 3–4-flowered; fruit obliquely obovoid, about 1″ long, lenticular, the back much curved and 2-grooved, the face arched and surmounted by the nearly sessile stigma; curve of the embryo oval, its apex nearly touching its base.

In lakes and slow streams, eastern Massachusetts to Michigan. Proliferous shoots at the summit of the stem and on the upper branches appear late in the season, as the plants are beginning to decay. July–Aug.

27. Potamogeton pusíllus L. Small Pondweed. (Fig. 168.)



Potamogeton pusillus L. Sp. Pl. 127. 1753.

Stems filiform, branching, 6′–2° long. Leaves all submerged, linear, obtuse and mucronate or acute at the apex, 2-glandular at the base, 1′–3′ long, about ½″ wide, 1–3-nerved, the lateral nerves often obscure; stipules short, hyaline, obtuse; peduncles usually 3″–9″, or rarely 3′ long; spikes 3–10-flowered; fruit obliquely ellipsoid, about 1″ long and ½″ thick curved and 2-grooved on the back or sometimes with 3 distinct keels, the face slightly arched, beaked by a straight or recurved style; apex of the embryo slightly incurved and pointing obliquely downward. Propagative buds occur in greater or less abundance.

In ponds and slow streams, New Brunswick to British Columbia, south to Virginia, Texas and California. Also in Europe. July–Aug.

Potamogeton pusillus Panormitànus (Biv.) Morong, Mem. Torr. Club, 3: Part 2, 46. 1893.

Potamogeton Panormitanus Biv. Sic. Pl. 1806–7.

Uppermost leaves subcoriaceous, spatulate, opposite, divaricate, 3–5-nerved, 4″–5″ long, tapering into a broad petiole as long as the blade. Ottawa, Ontario. Also in Europe.

Potamogeton pusillus polyphýllus Morong, Coult. Bot. Gaz. 5: 51. 1880.

Stem 3′–5′ long, divaricately branching from the base and very leafy throughout; leaves very obtuse, 3-nerved. Plant not known to flower, but abundantly provided with propagating buds which are thickened, hardened and closely invested by imbricated leaves. Eastern Massachusetts.

Potamogeton pusillus Sturróckii A. Bennett in Hook. Stud. Fl. Ed. 3, 435. 1884.

A rare form with delicate bright green pellucid leaves, 1′–3′ long, obtuse or often apiculate at the apex, less than 1″ wide, sometimes 5-nerved; fruit much smaller than that of the type, short-beaked. Eastern Massachusetts. Also in Europe.

28. Potamogeton gemmíparus (Robbins) Morong. Capillary Pondweed. (Fig. 169.)

Potamogeton pusillus var. (?) *gemmiparus* Robbins in A. Gray, Man. Ed. 5, 489. 1867.

Potamogeton gemmiparus Morong, Coult. Bot. Gaz. 5: 51. 1880.

Stems filiform, terete, branching, 5′–4° long. Leaves capillary, sometimes not as wide as the stem, often with no perceptible midrib, tapering to the finest point, 1′–3′ long, 2-glandular at the base; stipules ½′–1′ long, acute or obtuse, mostly deciduous; spikes interrupted, 3–6-flowered; peduncles filiform or sometimes slightly thickened, ½′–2′ long; fruit seldom formed, similar to that of *P. pusillus*, except that it is flatter and somewhat impressed on the sides.

In ponds, eastern Massachusetts and Rhode Island. It is commonly propagated by its abundant buds, the leaves and stems are often alike in thickness so that the plant seems to consist of threads. Aug.–Sept.

29. Potamogeton diversifòlius Raf. Rafinesque's Pondweed. (Fig. 170.)

Potamogeton hybridus Michx. Fl. Bor. Am. 1: 101. 1803. Not Thuill. 1790.
Potamogeton diversifolius Raf. Med. Rep. (II.) 5: 354. 1808.

Stems flattened or sometimes terete, much branched. Floating leaves coriaceous, the largest 1′ long by ½′ wide, oval or elliptic and obtuse, or lanceolate-oblong and acute; petioles generally shorter, but sometimes longer than the blades, filiform or dilated; submerged leaves setaceous, seldom over ¼″ wide, 1′–3′ long; stipules obtuse or truncate, 3″–5″ long, those of the floating leaves free, those of the submerged leaves sometimes adnate; emersed peduncles 3″–7″ long; submerged peduncles 2″–3″ long, clavate, as long as the spikes; emersed spikes 3″–5″ long, occasionally interrupted; fruit cochleate, rarely over ½″ long, 3-keeled, the middle keel narrowly winged and usually with 7 or 8 knob-like teeth on the margin, the lateral keels sharp or rounded; embryo coiled 1½ times.

In still water, Maine to Florida, west to Nebraska and Texas. June–Sept.

Potamogeton diversifòlius multidenticulàtus Morong, Mem. Torr. Club, 3: Part 2, 48. 1893.

Differs from the type in the numerous teeth of the fruit, as many as 12 being sometimes found on the middle keel, and each lateral keel with 6–8 more, the teeth often bristle-like and sometimes 2-pronged. Connecticut to eastern Pennsylvania and Delaware.

Potamogeton diversifòlius trichophýllus Morong, Mem. Torr. Club, 3: part 2, 49. 1893.

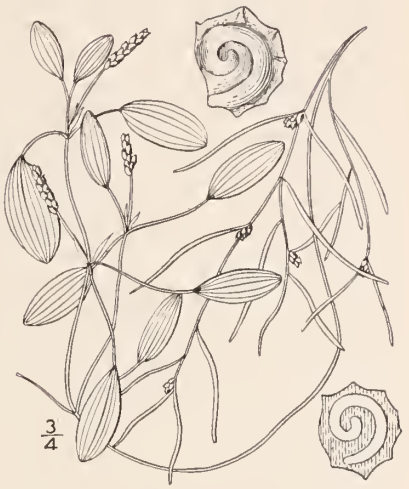
Plant about 6′ long, without floating leaves, the submerged leaves as fine as floss silk and entirely nerveless. Lake Marcia, New Jersey.

30. Potamogeton Spirillus Tuckerm. Spiral Pondweed. (Fig. 171.)

Potamogeton Spirillus Tuckerm. Am. Journ. Sci. (II) 6: 228. 1848.

Stems compressed, branched, 6′–20′ long, the branches often short and recurved. Floating leaves oval or elliptic, obtuse, the largest about 1′ long and ½′ wide, with 5–13 nerves deeply impressed beneath, their petioles often 1′ long; submerged leaves linear, 1½″–2″ long, about ½″ wide, mostly 5-nerved; stipules of the upper floating leaves free; those of the submerged leaves adnate to the blade or petiole; spikes above water 3″–5″ long, continuous, the lower mostly sessile, capitate and 1–10-fruited; fruit cochleate, roundish, less than 1″ long, flat and deeply impressed on the sides, 3-keeled on the back, the middle keel winged and sometimes 4–5-toothed; style deciduous; embryo spiral, about 1½ turns.

In ponds and ditches, Nova Scotia and Ontario to Minnesota, south to Virginia, Missouri and Nebraska. June–Aug.



31. Potamogeton filiformis Pers. Filiform Pondweed. (Fig. 172.)

Potamogeton filiformis Pers. Syn. 1: 152. 1805.

Stems from a running rootstock, slender, 3°–20° long, filiform above, stout and thick towards the base. Leaves numerous, 2′–12′ long, ¼″–½″ wide, 1-nerved with a few cross veins; sheaths about 1″ long and the free part of the stipule ½′ long, scarious on the edges; flowers on long, often recurved peduncles, 2–12 in each whorl, the whorls ¼′–1′ apart; fruit 1″–1½″ long, slightly less than 1″ wide, the sides even, the back not keeled, the face nearly straight or obtusely angled near the top; stigma nearly or quite sessile, remaining on the fruit as a broad truncate projection.

In ponds and lakes, Anticosti to western New York and Michigan. August.

Potamogeton filiformis Macounii Morong; Macoun, Cat. Can. Pl. 4: 88. 1888.

Leaves 1′–3′ long, the largest ½″ or more wide, obtuse, stiff, with a strong midrib and raised or slightly revolute margins; fruit rarely more than 1″ long; peduncles only 8″–10″ long; plant commonly with a compact bushy habit. In brackish or salt water lakes, prairie region of Canada.

32. Potamogeton pectinatus L. Fennel-leaved Pondweed. (Fig. 173.)

Potamogeton pectinatus L. Sp. Pl. 127. 1753.

Stems slender, much branched, 1°–3° long, the branches repeatedly forking. Leaves setaceous, attenuate to the apex, 1-nerved, 1′–6′ long, often capillary and nerveless; stipules half free, ½′–1′ long, their sheaths scarious on the margins; peduncles filiform, 2′–12′ long, the flowers in verticils; fruit obliquely obovoid, with a hard thick shell, 1½″–2″ long, 1″–1¼″ wide, without a middle keel, but with obscure lateral ridges on the back, plump on the sides and curved or occasionally a little angled on the face; style straight or recurved, facial; embryo apex pointing almost directly toward the basal end.

In fresh, brackish or salt water, Cape Breton to British Columbia, south to Florida, Texas and California. Also in Europe. July–Aug.

33. Potamogeton interrúptus Kitaibel. Interrupted Pondweed. (Fig. 174.)

Potamogeton interruptus Kitaibel in Schultes, OEst. Fl. Ed. 2, 328. 1814.
Potamogeton flabellatus Bab. Man. Bot. Ed. 3, 324. 1851.

Stems arising from a running rootstock which often springs from a small tuber, 2°–4° long, branched, the branches spreading like a fan. Leaves linear, obtuse or acute, 3′–5′ long, 1″–1¼″ wide, 3–5-nerved with many transverse veins; narrow, 1-nerved leaves occur on some plants and these are acuminate, much like those of *P. pectinatus;* stipules partially adnate to the leaf-blade, the adnate part ½′–1′ long, sometimes with narrowly scarious margins, the free part shorter and scarious, obtuse; peduncles 1′–2′ long; spikes slightly interrupted; fruit broadly and obliquely obovoid, obtuse at the base, the largest 2″ long and nearly as broad, prominently keeled and with rounded lateral ridges on the back, the face nearly or quite straight; style facial, erect.

In ponds and streams, Prince Edward Island to northern Indiana and Michigan. Also in Europe. August.

34. Potamogeton Robbínsii Oakes. Robbins' Pondweed. (Fig. 175.)

Potamogeton Robbinsii Oakes, Hovey's Mag. 7: 180. 1841.

Stems stout, widely branching, 2°–4° long, from running rootstocks sometimes 1° long. Leaves linear, 3′–5′ long, 2″–3″ wide, acute, finely many-nerved, crowded in 2 ranks, minutely serrulate, auriculate at the point of attachment with the stipule; stipules with the adnate portion and sheathing base of the leaf about ½′ long, the free part ½′–1′ long, acute, persistent, white, membranous, mostly lacerate; peduncles 1′–3′ long, the inflorescence frequently much branched and bearing from 5–20 peduncles; spikes interrupted, ½′–1′ long, flowering under water; fruit obovoid, about 2″ broad and 1½″ wide, 3-keeled on the back, the middle keel sharp, the lateral ones rounded, the face arched, the sides with a shallow depression which runs into the face below the arch; style subapical, thick, slightly recurved; apex of the embryo pointing a little inside the basal end.

In ponds and lakes, New Brunswick to Oregon, south to New Jersey, Pennsylvania and Michigan. The plant is freely propagated by fragments of the stems which throw out rootlets from each joint, but this is the rarest of our species to form fruit. Aug.–Sept.

2. RÚPPIA L. Sp. Pl. 127. 1753.

Slender, widely branched aquatics with capillary stems, slender alternate 1-nerved leaves tapering to an acuminate apex, and with membranous sheaths. Flowers on a capillary, spadix-like peduncle, naked, consisting of 2 sessile anthers, each with 2 large separate sacs attached by their backs to the peduncle, having between them several pistillate flowers in 2 sets on opposite sides of the rachis, the whole cluster at first enclosed in the sheathing base of the leaf. Stigmas sessile, peltate. Fruit a small, obliquely pointed drupe, several in each cluster and pedicelled; embryo oval, the cotyledonary end inflexed, and both that and the hypocotyl immersed. [Name in honor of Heinrich Bernhard Rupp, a German botanist.]

In the development of the plants the staminate flowers drop off and the peduncle elongates, bearing the pistillate flowers in 2 clusters at the end, but after fertilization it coils up and the fruit is drawn below the surface of the water.

Three or four species, occurring in salt and brackish waters all over the world. The following are the only ones known to occur in North America:

Sheaths 3″–4″ long; drupes about 1″ long. 1. *R. maritima.*
Sheaths ½′–1½′ long; drupes 1½″–2″ long. 2. *R. occidentalis.*

1. Ruppia maritima L. Maritime Ruppia. (Fig. 176.)

Ruppia maritima L. Sp. Pl. 127. 1753.

Stems often whitish, 2°–3° long, the internodes irregular, naked, 1′–3′ long. Leaves 1′–3′ long, ¼″ or less wide; sheaths 3″–4″ long, with a short free tip; peduncles in fruit sometimes 1° long; pedicels 4–6 in a cluster, ½′–1½′ long; drupes with a dark hard shell, ovoid, about 1″ long, often oblique or gibbous at the base, pointed with the long style, but varying much in shape; forms with very short peduncles and pedicels, and with broad, strongly marked sheaths occur.

Common in brackish or salt water along the Atlantic and Pacific Coasts of North America and in saline districts in the interior. Widely distributed in the Old World and in South America. July–Aug.

2. Ruppia occidentàlis S. Wats. Western Ruppia. (Fig. 177.)

Ruppia occidentalis S. Wats. Proc. Am. Acad. 25: 138. Sept. 1890.

Ruppia lacustris Macoun, Cat. Can. Pl. 5: 372. Nov. 1890.

Stems stouter, 1°–2° long, the branching fan-like. Leaves 3′–8′ long, their large sheaths ½′–1½′ long; branches and leaves often thickly clustered at the nodes, the sheaths overlapping each other; drupes larger, 1½″–2″ long, ovoid or pyriform, borne on pedicels about 1′ long, the peduncles bright red when fresh and sometimes nearly 2° in length.

In saline ponds, Nebraska to British Columbia. Summer.

3. ZANNICHÉLLIA L. Sp. Pl. 969. 1753.

Stems, flowers and leaf-buds all at first enclosed in a hyaline envelope, corresponding to the stipule in *Potamogeton*. Staminate and pistillate flowers in the same axil; the staminate solitary, consisting of a single 2-celled anther, borne on a short pedicel-like filament; the pistillate 2–5. Ovary flask-shaped, tapering into a short style; stigma broad, hyaline, somewhat cup-shaped, its margins angled or dentate. Fruit a flattish falcate nutlet, ribbed or sometimes toothed on the back. Embryo bent and coiled at the cotyledonary end. [In honor of J. H. Zannichelli, 1662–1729, Italian physician and botanist.]

Two or three species of very wide geographic distribution in fresh-water ponds and streams.

1. Zannichellia palústris L. Zannichellia. (Fig. 178.)

Zannichellia palustris L. Sp. Pl. 969. 1753.

Stems capillary, sparsely branched, the rhizome creeping, the roots fibrous. Leaves 1′–3′ long, ¼″ or less wide, acute, thin, 1-nerved with a few delicate cross-veins; spathe-like envelope separate from the leaves and fruits at maturity; fruits 2–6 in a cluster, 1″–2″ long, sometimes sessile, sometimes pedicelled, sometimes the whole cluster peduncled; style persistent, straight or curved, ½″–1″ long; plant flowering and ripening its fruit under water.

In fresh or brackish ponds, pools or ditches, nearly throughout North America, except the extreme north, and widely distributed in the Old World. July–Sept.

4. NÀIAS L. Sp. Pl. 1015. 1753.

Slender, branching aquatics, wholly submerged, with fibrous roots. Leaves opposite, alternate or verticillate, sheathing at the base. Flowers monoecious or dioecious, axillary, solitary, sessile or pedicelled. Sterile flower with a double perianth, the exterior one entire or 4-horned at the apex, the interior one hyaline, adhering to the anther; stamen sessile or stalked, 1-4-celled, apiculate or 2-lobed at the summit. Fertile flowers of a single ovary which tapers into a short style; stigmas 2–4, subulate. Mature carpel solitary, sessile, ellipsoid, its pericarp crustaceous. Seed conformed to the pericarp and embryo to the seed, the raphe distinctly marked. [Greek, a water-nymph.]

About 10 species, occurring in fresh water all over the world. The following are the only ones known in North America:

Sheaths broadly rounded, their margins entire or with a few large teeth. 1. *N. marina.*
Sheaths narrowly and obliquely rounded, each margin with 5–10 minute teeth; leaves linear.
Seeds shining, with 30–50 rows of faint reticulations. 2. *N. flexilis.*
Seeds dull, with 16–20 rows of strongly marked reticulations. 3. *N. Guadalupensis.*
Sheaths auriculate; leaves delicately filiform. 4. *N. gracillima.*

1. Naias marìna L. Large Naias. (Fig. 179.)

Naias marina L. Sp. Pl. 1015. 1753.
Naias major All. Fl. Ped. 2: 221. 1785.

Dioecious, stem stout, compressed, commonly armed with teeth twice as long as their breadth. Leaves opposite or verticillate, 6″–12″ long, about 1″ wide, with 6–10 spine-pointed teeth on each margin and frequently several along the back; sheaths with rounded lateral edges; fruit large, 2″–2½″ long, the pericarp as well as the seed rugosely reticulated, tipped with a long persistent style and 3 thread-like stigmas; seed not shining.

In lakes, Central New York to Florida, west to California. Summer. Also in Europe.

Naias marìna grácilis Morong, Coult. Bot. Gaz. 10: 255. 1885.

Internodes 1′–3′ long, with a few teeth on the upper part; leaves scarcely ¼″ wide, with 15–24 large teeth on the margins and a few on the back; sheaths with 2 or 3 teeth on each margin; seed sculptured with about 25 rows of nearly square or irregularly oblong reticulations. Central New York and Florida.

Naias marìna recurvàta Dudley, Cayuga Fl. 104. 1886.

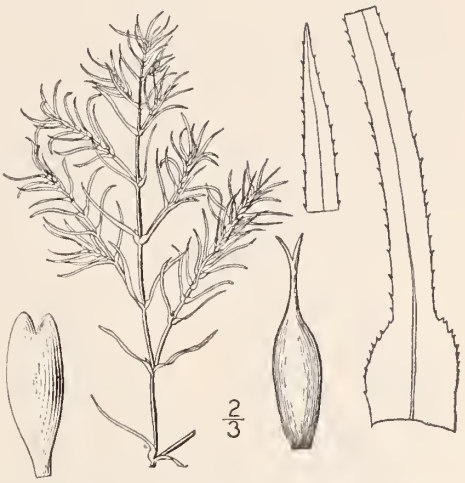
Branches and leaves recurved; leaves 3″–6″ long, narrow, with 2–4 large teeth on each margin and none on the back; internodes short, naked, or with 1 or 2 teeth; sheaths 1-toothed on each side. Cayuga Marshes, N. Y.

2. Naias flexilis (Willd.) Rost. & Schmidt. Slender Naias. (Fig. 180.)

Caulinia flexilis Willd. Abh. Akad. Berlin, 95. 1803.
Naias flexilis Rost. & Schmidt, Fl. Sed. 384. 1824.

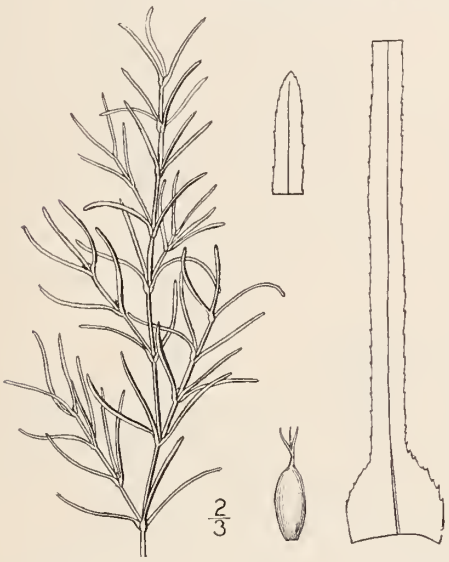
Stem slender, forking. Leaves linear, pellucid, acuminate or abruptly acute, ½′–1′ long, ½″–1″ wide, numerous and crowded on the upper parts of the branches, with 25–30 minute teeth on each edge; sheaths obliquely rounded with 5–10 teeth on each margin; fruit ellipsoid with very thin pericarp, 1″–2″ long, ¼″–½″ in diameter; style long, persistent; stigmas short; seed smooth, shining, straw-colored, sculptured, though sometimes quite faintly, with 30–40 rows of nearly square or hexagonal reticulations which are scarcely seen through the dark pericarp.

In ponds and streams throughout nearly all North America. Also in Europe. Summer.



Naias flexilis robusta Morong, Coult. Bot. Gaz. 10: 255. 1885.

Stem stout, few-leaved, 3°–6° long; internodes long. Massachusetts to Michigan and Texas.



3. Naias Guadalupénsis (Spreng.) Morong. Guadaloupe Naias. (Fig. 181.)

Caulinia Guadalupensis Spreng. Syst. 1: 20. 1825.
Naias Guadalupensis Morong, Mem. Torr. Club, 3: Part 2, 60. 1893.

Stem nearly capillary, 1°–2° long, widely branched from the base. Leaves numerous, 6″–9″ long, ¼″–½″ wide, acute, opposite or in fascicles of 2–5, frequently recurved, with sheaths and teeth like those of *N. flexilis* but generally with 40–50 teeth on each margin of the leaf; fruit about 1″ long; pericarp dark and strongly marked by 16–20 rows of hexagonal or rectangular reticulations which are transversely oblong; seed straw-colored, not shining.

In ponds and lakes, Nebraska to Oregon and Texas, east to Florida. Also in tropical America. July–Sept.

4. Naias gracíllima (A. Br.) Morong. Thread-like Naias. (Fig. 182.)

Naias Indica var. *gracillima* A. Br.; Engelm. in A. Gray, Man. Ed. 5, 681. 1867.
Naias gracillima Morong, Mem. Torr. Club, 3: Part 2, 61. 1893.

Dioecious, stem capillary, 6′–15′ long, much branched, the branches alternate. Leaves numerous, opposite or often fascicled in 3's–5's or more, setaceous, ½′–2′ long, usually with about 20 minute teeth on each margin; sheaths auricled, with 6 or 7 teeth on each auricle, the teeth standing upon setaceous divisions of the sheath; stigmas very short; fruit oblong-cylindric, ½″ long, ¼″ in diameter, slightly curved inwardly or straight, the pericarp straw-colored or purplish, marked by about 25 rows of irregularly oblong reticulations; seed not shining.

In pools and ponds, eastern Massachusetts to Delaware, Pennsylvania and Missouri. July–Sept.

5. ZOSTÈRA L. Sp. Pl. 968. 1753.

Marine plants with slender rootstocks and branching compressed stems. Leaves 2-ranked, sheathing at the base, the sheaths with inflexed margins. Spadix linear, contained in a spathe. Flowers monoecious, arranged alternately in 2 rows on the spadix. Staminate flower merely an anther attached to the spadix near its apex, 1-celled, opening irregularly on the ventral side; pollen thread-like. Pistillate flower fixed on its back near the middle; ovary 1; style elongated; stigmas 2, capillary; mature carpels flask-shaped, membranous, rupturing irregularly, beaked by the persistent style; seeds ribbed; embryo ellipsoid. [Greek, referring to the ribbon-like leaves.]

About 6 species of marine distribution. Besides the following one occurs in Florida and one on the Pacific Coast.

1. Zostera marìna L. Eel-grass. Grass-wrack. (Fig. 183.)

Zostera marina L. Sp. Pl. 968. 1753.

Leaves ribbon-like, obtuse at the apex, 1°–6° long, 1″–4″ wide, with 3–7 principal nerves. Spadix 1′–2½′ long; flowers about 3″ long, crowded, usually from 10–20 of each kind on the spadix; ovary somewhat vermiform; at anthesis the stigmas are thrust through the opening of the spathe and drop off before the anthers of the same spadix open; the anthers at anthesis work themselves out of the spathe and discharge the glutinous stringy pollen into the water; seeds cylindric, strongly about 20-ribbed, about 1½″ long and ½″ in diameter, truncate at both ends, the ribs showing very clearly on the pericarp.

In bays, streams and ditches along the Atlantic Coast from Greenland to Florida and on the Pacific from Alaska to California. Also on the coasts of Europe and Asia. Summer.

Family 4. SCHEUCHZERIÀCEAE Agardh, Theor. Syst. Pl. 44. 1858.*

ARROW-GRASS FAMILY.

Marsh herbs with rush-like leaves and small spicate or racemose perfect flowers. Perianth 4–6-parted, its segments in two series, persistent or deciduous. Stamens 3–6. Filaments very short or elongated. Anthers mostly 2-celled and extrorse. Carpels 3–6, 1–2-ovuled, more or less united until maturity, dehiscent or indehiscent. Seeds anatropous. Embryo straight.

Four genera and about 10 species of wide geographic distribution.

Leaves all basal; flowers numerous on naked scapes, spicate or racemed. 1. *Triglochin.*
Stem leafy; flowers few in a loose raceme. 2. *Scheuchzeria.*

1. TRIGLÒCHIN L. Sp. Pl. 338. 1753.

Marsh herbs with basal half-rounded ligulate leaves with membranous sheaths. Flowers in terminal spikes or racemes on long naked scapes. Perianth-segments 3–6, concave, the 3 inner ones inserted higher up than the outer. Stamens 3–6; anthers 2-celled, sessile or nearly so, inserted at the base of the perianth-segments and attached by their backs. Ovaries 3–6, 1-celled, sometimes abortive; ovules solitary, basal, erect, anatropous. Style short or none. Stigmas as many as the ovaries, plumose. Fruit of 3–6 cylindraceous oblong or obovoid carpels, which are distinct or connate, coriaceous, costate, when ripe separating from the base upward from a persistent central axis, their tips straight or recurved, dehiscing by a ventral suture. Seeds erect, cylindraceous or ovoid-oblong, compressed or angular. [Greek, in allusion to the three-pointed fruit of some species.]

About 9 species, natives of the temperate and subarctic zones of both hemispheres. Only the following are known to occur in North America:

Carpels 3.
Fruit linear or clavate, tapering to a subulate base. 1. *T. palustris.*
Fruit nearly globose. 2. *T. striata.*
Carpels 6; fruit oblong or ovoid, obtuse at the base. 3. *T. maritima.*

*Text contributed by the late REV. THOMAS MORONG.

1. Triglochin palústris L. Marsh Arrow-grass. (Fig. 184.)

Triglochin palustris L. Sp. Pl. 338. 1753.

Rootstock short, oblique, with slender fugacious stolons. Leaves linear, shorter than the scapes, 5′–12′ long, tapering to a sharp point; ligule very short; scapes 1 or 2, slender, striate, 8′–20′ high; racemes 5′–12′ long; pedicels capillary, in fruit erect-appressed and 2½″–3½″ long; perianth-segments 6, greenish-yellow; anthers 6, sessile; pistil of 3 united carpels, 3-celled, 3-ovuled; stigmas sessile; fruit 3″–3½″ long, linear or clavate; ripe carpels separating from the axis and hanging suspended from its apex, the axis 3-winged.

In bogs, New Brunswick to Alaska, south to New York, Indiana and Montana. Also in Europe and Asia. July–Sept.

2. Triglochin striàta R. & P. Three-ribbed Arrow-grass. (Fig. 185.)

Triglochin striata R. & P. Fl. Per. 3: 72. 1802.
Triglochin triandra Michx. Fl. Bor. Am. 1: 208. 1803.

Rootstocks upright or oblique. Scapes 1 or 2, more or less angular, usually not over 10′ high; leaves slender, slightly fleshy, nearly or quite as long as the scapes, ¼″–1″ wide; flowers very small, light yellow or greenish, in spicate racemes; pedicels ½″–1″ long, not elongating in fruit; perianth-segments 3, stamens 3; anthers oval, large; pistil of 3 united carpels; fruit sub-globose or somewhat obovoid, about 1″ in diameter, appearing 3-winged when dry by the contracting of the carpels; carpels coriaceous, rounded and 3-ribbed on the back; axis broadly 3-winged.

In saline marshes, Maryland to Florida and Louisiana. Also in tropical America. June–Sept.

3. Triglochin marítima L. Seaside Arrow-grass. (Fig. 186.)

Triglochin maritima L. Sp. Pl. 339. 1753.
Triglochin elata Nutt. Gen. 1: 237. 1818.
Triglochin maritima var. *elata* A. Gray, Man. Ed. 2, 437. 1852. In part.

Rootstock without stolons, often subligneous, the caudex thick, mostly covered with the sheaths of old leaves. Scape stout, nearly terete, 6′–2° high; leaves half-cylindric, usually about 1″ wide; raceme elongated, often 16′ or more long; pedicels decurrent, 1″–1½″ long, slightly longer in fruit; perianth segments 6, each subtending a large sessile anther; pistil of 6 united carpels; fruit oblong or ovoid, 2½″–3″ long, 1½″–2″ thick, obtuse at the base, with 6 recurved points at the summit; carpels 3-angled, flat or slightly grooved on the back, or the dorsal edges curving upward and winged, separating at maturity from the hexagonal axis.

In salt marshes, along the Atlantic seaboard from Labrador to New Jersey, and in fresh or saline marshes across the continent to Alaska and California. Also in Europe and Asia. July–Sept.

2. SCHEUCHZÈRIA L. Sp. Pl. 338. 1753.

Rush-like bog perennials with creeping rootstocks, and erect leafy stems, the leaves elongated, half-rounded below and flat above, striate, furnished with a pore at the apex and a membranous ligulate sheath at the base. Flowers small, racemose. Perianth 6-parted, regularly 2-serial, persistent. Stamens 6, inserted at the base of the perianth-segments; filaments elongated; anthers linear, basifixed, extrorse. Ovaries 3 or rarely 4–6, distinct or connate at the base, 1-celled, each cell with 1 or 2 collateral ovules. Stigmas sessile, papillose or slightly fimbriate. Carpels divergent, inflated, coriaceous, 1–2-seeded, follicle-like, laterally dehiscent. Seeds straight or slightly curved, without endosperm. [Name in honor of Johann Jacob Scheuchzer, 1672–1733, Swiss scientist.]

A monotypic genus of the north temperate zone.

1. Scheuchzeria palústris L. Scheuchzeria. (Fig. 187.)

Scheuchzeria palustris L. Sp. Pl. 338. 1753.

Leaves 4′–16′ long, the uppermost reduced to bracts; stems solitary or several, usually clothed at the base with the remains of old leaves, 4′–10′ tall; sheaths of the basal leaves often 4′ long with a ligule ½′ long; pedicels 3″–10″ long, spreading in fruit; flowers white, few, in a lax raceme; perianth-segments membranous, 1-nerved, 1½″ long, the inner ones the narrower; follicles 2″–4″ long, slightly if at all united at the base; seeds oval, brown, 2½″–3″ long with a very hard coat.

In bogs, Labrador to Hudson Bay and British Columbia, south to New Jersey, Pennsylvania, Wisconsin and California. Also in Europe and Asia. Summer.

Family 5. ALISMÀCEAE DC. Fl. Franc. 3: 181. 1805.

Water-Plantain Family.

Aquatic or marsh herbs, mostly glabrous, with fibrous roots, scapose stems and basal long-petioled sheathing leaves. Inflorescence racemose or paniculate. Flowers regular, perfect, monoecious or dioecious, pedicelled, the pedicels verticillate and subtended by bracts. Receptacle flat or convex. Sepals 3, persistent. Petals 3, larger, deciduous, imbricated in the bud. Stamens 6 or more; anthers 2-celled, extrorse or dehiscing by lateral slits. Ovaries numerous or rarely few, 1-celled, usually with a single ovule in each cell. Carpels becoming achenes in fruit in our species. Seeds uncinate-curved. Embryo horseshoe shaped. Endosperm none. Latex-tubes are found in all the species, according to Micheli.

About 13 genera and 65 species, of wide distribution in fresh water swamps and streams.

Carpels in a ring upon a small, flat receptacle.	1. *Alisma.*
Carpels crowded in many series upon a large convex receptacle.	
Flowers perfect, staminate or polygamous.	
Pedicels not recurved; calyx spreading.	2. *Echinodorus.*
Pedicels recurved in fruit; calyx appressed to the carpels.	3. *Lophotocarpus.*
Flowers monoecious or dioecious.	4. *Sagittaria.*

1. ALÍSMA L. Sp. Pl. 342. 1753.

Perennial or rarely annual herbs with erect or floating leaves, the blades several-ribbed, the ribs connected by transverse veinlets, or seemingly pinnately veined. Scapes short or elongated. Inflorescence paniculate or umbellate-paniculate. Flowers small, numerous on unequal 3-bracteolate pedicels, the petals white or rose-tinted. Stamens 6 or 9, subperigynous. Ovaries few or many, borne in one or several whorls on a small flat receptacle, ripening into flattened achenes which are 2–3-ribbed on the curved back and 1–2-ribbed on the sides. [Greek, said to be in reference to the occurrence of the typical species in saline situations.]

About 10 species, widely distributed in temperate and tropical regions. Only the following are known to occur in North America.

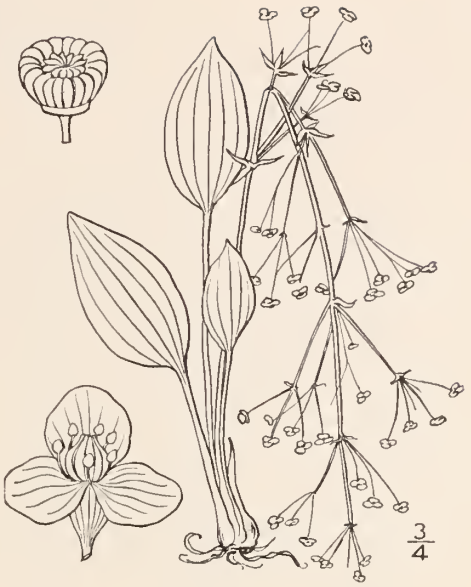
Stamens 6, strongly compressed; flowers panicled.	1. *A. Plantago-aquatica.*
Stamens 9, turgid; flowers umbelled.	2. *A. tenellum.*

1. **Alisma Plantàgo-aquática** L. Water Plantain. (Fig. 188.)

Alisma Plantago-aquatica L. Sp. Pl. 342. 1753.

Leaves ovate, acute at the apex, cordate, rounded or narrowed at the base, the blades 3–10-ribbed, or when floating sometimes lanceolate or even linear; petioles 1′–10′ long; scapes occasionally 2 from the same root, usually solitary, ½°–3° high; inflorescence a large loose panicle, 6′–15′ long; pedicels verticillate in 3's–10's, subtended by 3 striate acuminate bracts; petals ½″–1″ long; styles deciduous, the base remaining as a small point or short beak on the inuer curve of the achene; stigma small, terminal; achenes obliquely obovate, nearly 1″ long, arranged in a circle, formiug an obtusely triangular truncate head.

In shallow water or mud throughout North America. Also in Europe and Asia. June–Sept.



2. **Alisma tenéllum** Mart. Dwarf Water Plantain. (Fig. 189.)

Alisma tenellum Mart.; R. & S. Syst. 7: 1600. 1830.
Echinodorus parvulus Engelm. in A. Gray, Man. Ed. 2, 438. 1856.
Echinodorus tenellus Buchenau, Abh. Nat. Gesell. Bremen, 2: 18. 1869.

Plant delicate, stoloniferous, 1′–5′ high. Leaves lanceolate or linear-lanceolate, the blades acute at both ends, 4″–15″ long, 1″–3″ wide; petioles longer or shorter thau the blades, uarrowly dilated at the base; scapes solitary, often surpassing the leaves, commonly reclined; umbel 2–8-flowered; pedicels very unequal, often recurved in fruit; bracts lanceolate, more or less counate at the base; flowers white; stamens 9; style mueh shorter than the ovary; ovaries uumerous; acheues in several whorls, coriaceous, turgid, obovate, not ½″ long, enclosed by the erect persistent sepals, the beak short, sharp.

In mud, Massachusetts to western Ontario and Minnesota, south to Florida, Missouri and Texas. April–Aug.

2. **ECHINÓDORUS** Rich.; Engelm. in A. Gray, Man. 460. 1848.

Perennial or annual herbs with long-petioled, elliptic, ovate or lanceolate often cordate or sagittate leaves, 3–9-ribbed and mostly punctate with dots or lines. Scapes often longer than the leaves; inflorescence racemose or paniculate, the flowers verticillate, each verticil with 3 outer bracts and numerous inner bracteoles; flowers perfect; sepals 3, distinct, persistent; petals white, deciduous; receptacle large, convex or globose; stamens 12–30; ovaries numerous; style obliquely apical, persistent; stigma simple; fruit achenes, more or less compressed, coriaceous, ribbed and beaked, forming spinose heads. [Greek, in allusion to the spiuose heads of fruit.]

About 14 species, mostly natives of America. Only the following are known in North America.

Scapes reclining or prostrate; style shorter than the ovary; beak of achene short. 1. *E. radicans.*
Scapes erect; style longer than the ovary; beak of achene long. 2. *E. cordifolius.*

1. Echinodorus radìcans (Nutt.) Engelm. Creeping Bur-head. (Fig. 190.)

Sagittaria radicans Nutt. Trans. Am. Phil. Soc. (II.) 5: 159. 1833–37.
Echinodorus radicans Engelm. in A. Gray, Man. Ed. 2, 438. 1856.

Leaves coarse, ovate, obtuse, cordate, 2′–8′ long, 1½′–7½′ wide, marked with short pellucid lines, the nerves 5–9, connected by netted cross-veins. Petioles sometimes 20′ long; scapes creeping, 2°–4° long, slightly scabrous, often rooting at the nodes; verticils distant; bracts linear-lanceolate, acuminate, dilated at the base; pedicels 3–12, unequal, 1′–2½′ long, slender or filiform; sepals persistent, much shorter than the heads; petals larger, obovate, about 3″ long; stamens about 20; style shorter than the ovary; achenes numerous, about 2″ long, 6–10-ribbed, with 2-several oval glands on each side and beaks about one-fourth their length; fruiting heads 4″ in diameter.

In swamps, Illinois to North Carolina and Florida, west to Missouri and Texas. June–July.

2. Echinodorus cordifòlius (L.) Griseb. Upright Bur-head. (Fig. 191.)

Alisma cordifolia L. Sp. Pl. 343. 1753.
Echinodorus rostratus Engelm. in A. Gray, Man. Ed. 2, 538. 1856.
Echinodorus cordifolius Griseb. Abh. Kon. Gesell. Wiss. Gott. 7: 257. 1857.

Leaves variable in form, often broadly ovate, obtuse, cordate at the base, 6′–8′ long and wide, but in smaller plants sometimes nearly lanceolate, acute at each end and but 1′–2′ long; petioles angular, striate, 1′–10′ high; scapes 1 or more, erect, 5′–16′ tall; flowers 3–6 in the verticils; pedicels ¼′–½′ long, erect after flowering; bracts linear-lanceolate, acuminate, dilated at the base; sepals shorter than the heads; petals 2″–3″ long; stamens often 12; styles longer than the ovary; fruiting heads very burr-like, 2″–3″ in diameter; achenes about 1½″ long, narrowly obovate or falcate, 6–8-ribbed; beak apical, obliqne, about one-half the length of the achene.

In swamps and ditches, Illinois to Florida, west to Missouri and Texas. Also in tropical America. June–July.

3. LOPHOTOCÀRPUS T. Durand, Ind. Gen. Phan. 627. 1888.

[Lophiocarpus Miqnel, Fl. Arch. Ind. 1: Part 2, 50. 1870. Not Turcz. 1843.]

Perennial, bog or aquatic herbs with basal long-petioled sagittate or cordate leaves, simple erect scapes bearing flowers in several verticils of 2–3 at the summit, the lower perfect, the upper staminate. Sepals 3, distinct, persistent, erect after flowering and enclosing or enwrapping the fruit. Petals white, deciduous. Receptacle strongly convex. Stamens 9–15, hypogynous, inserted at the base of the receptacle. Filaments flattened. Pistils numerous; ovule solitary, erect, anatropous; style elongated, obliqne, persistent. Achenes winged or crested. Embryo horseshoe-shaped. [Greek, signifying crested fruit.]

About 3 species, the following of eastern North America, the others of tropical America.

1. Lophotocarpus calycinus (Engelm.) J. G. Smith. Lophotocarpus. (Fig. 192.)

Sagittaria calycina Engelm.; Torr. Bot. Mex. Bound. Surv. 212. 1859.
Lophiocarpus calycinus Micheli in DC. Monog. Phan. 3: 61. 1881.
Lophotocarpus calycinus J. G. Smith, Mem. Torr. Club, 5: 25. 1894.

Annual, leaves floating or ascending, entire, hastate or sagittate, the basal lobes spreading, ovate, acute or acuminate, the apex acute or obtuse, the blade varying from 1′–8′ long, sometimes 12′ wide at the base. Scape simple, weak and at length decumbent, mostly shorter than the leaves; verticils of flowers 1–5; bracts membranous, orbicular or ovate and obtuse, or those of staminate flowers lanceolate and acute; fertile pedicels very thick, recurved in fruit, equalling or longer than the slender sterile ones; petals 3″–4″ long; stamens hypogynous; filaments flattened, papillose, about as long as the anthers; achene obovate, 1″ long, narrowly winged on the margins, tipped with a short horizontal triangular beak.

In swamps, New Brunswick to Virginia and Louisiana, across the continent to California, thus occurring nearly throughout the United States. Foliage wonderfully variable in form. July–Sept.

4. SAGITTÀRIA L. Sp. Pl. 993. 1753.

Perennial aquatic or bog herbs, mostly with tuber-bearing or nodose rootstocks, fibrous roots, basal long petioled nerved leaves, the nerves connected by numerous veinlets, and erect, decumbent or floating scapes, or the leaves reduced to bladeless phyllodia (figs. 197, 203). Flowers monoecious or dioecious, borne near the summits of the scapes in verticils of 3's, pedicelled, the staminate usually uppermost. Verticils 3-bracted. Calyx of 3 persistent sepals, those of the pistillate flowers reflexed or spreading in our species. Petals 3, white, deciduous. Stamens usually numerous, inserted on the convex receptacle; anthers 2-celled, dehiscent by lateral slits; staminate flowers sometimes with imperfect ovaries. Pistillate flowers with numerous distinct ovaries, sometimes with imperfect stamens; ovule solitary; stigmas small, persistent. Achenes numerous, densely aggregated in globose or subglobose heads, compressed. Seed erect, curved; embryo horseshoe-shaped. [Latin, referring to the arrow-shaped leaves of some species.]

About 25 species, natives of temperate and tropical regions. Besides the following, some 10 others occur in the southern and western parts of North America.

Fertile pedicels slender, ascending, not reflexed in fruit.
- Leaf-blades sagittate.
  - Basal lobes one-fourth to one-half the length of the blade.
    - Beak of the achene more than one-fourth its length.
      - Beak of the achene erect.
        - Fruiting pedicels shorter than the bracts; leaves broad. 1. *S. longirostra.*
        - Fruiting pedicels longer than the bracts; leaves narrow. 2. *S. Engelmannia.*
      - Beak of the achene horizontal or oblique. 3. *S. latifolia.*
    - Beak of the achene less than one-fourth its length.
      - Petioles rather short, curving; bracts long; bog species. 4. *S. arifolia.*
      - Petioles elongated; bracts short; aquatic species. 5. *S. cuneata.*
  - Basal lobes two-thirds to three-fourths the length of the blade. 6. *S. longiloba.*
- Leaves entire, or rarely hastate or cordate.
  - Filaments slender, tapering upward; leaves seemingly pinnately veined.
    - Filaments glabrous; bracts connate. 7. *S. ambigua.*
    - Filaments cobwebby-pubescent; bracts mostly distinct. 8. *S. lancifolia.*
  - Filaments abruptly dilated, pubescent; veins distinct to the base of the blade.
    - Fruiting heads sessile or very nearly so. 9. *S. rigida.*
    - Both staminate and pistillate flowers pedicelled.
      - Leaves reduced to terete nodose phyllodia, rarely blade-bearing. 10. *S. teres.*
      - Leaves rigid, blades elliptic-linear. 11. *S. cristata.*
      - Leaves not rigid; blades lanceolate or linear-oblong. 12. *S. graminea.*

Fertile pedicels stout, reflexed in fruit; filaments dilated.
- Filaments pubescent; leaf-blades ovate or ovate-elliptic. 13. *S. platyphylla.*
- Filaments glabrous; leaves linear-lanceolate or reduced to phyllodia. 14. *S. subulata.*

1. **Sagittaria longiróstra** (Micheli) J. G. Smith. Long-beaked Arrow-head. (Fig. 193.)

Sagittaria sagittaefolia var. *longirostra* Micheli in DC. Monog. Phan. 3 : 69. 1881.
Sagittaria longirostra J. G. Smith, Mem. Torr. Club, 5 : 26. 1894.

Monoecious, glabrous, scapes erect, rather stout, 1½°–3° tall. Leaves broad, sagittate, 4′–12′ long, abruptly acute at the apex, the basal lobes ovate or ovate-lanceolate, acute, one-third to one-half the length of the blade; scape usually longer than the leaves, 6-angled below; bracts triangular-lanceolate, acuminate, 7″–15″ long, longer than the fertile pedicels; petals 8″–14″ long; filaments glabrous; styles curved, twice as long as the ovaries; achene obovate, about 2″ long, winged on both margins, the ventral margin entire or undulate, the dorsal eroded, its sides with a short crest, its beak stout, erect or somewhat recurved.

In swamps and along ponds. New Jersey and Pennsylvania to Alabama. July–Sept.

2. **Sagittaria Engelmanniàna** J. G. Smith. Engelmann's Arrow-head. (Fig. 194.)

Sagittaria variabilis var. (?) *gracilis* S. Wats. in A. Gray, Man. Ed. 6, 555. 1889. Not Engelm.
Sagittaria Engelmanniana J. G. Smith, Mem. Torr. Club, 5: 25. 1894.

Monoecious, glabrous, scape erect or ascending, slender, 8′–20′ high. Leaves narrow, 1½′–8′ long, 1″–4″ wide, acute or obtuse at the apex, the basal lobes narrowly linear, acuminate, one-third to one-half the length of the blade; scape striate, about as long as the leaves; bracts lanceolate, acute, shorter than the slender fertile pedicels, 4″–6″ long; flowers 7″–12″ broad; filaments glabrous; style about twice as long as the ovaries; achene obovate, 2″ long, winged on both margins and with 1–3 lateral wing-like crests on each face, the beak short, stout, erect, about ½″ long.

In shallow water, Massachusetts to Delaware, near the coast, probably extending further south. Aug.–Sept.

3. **Sagittaria latifòlia** Willd. Broad-leaved Arrow-head. (Fig. 195.)

Sagittaria latifolia Willd. Sp. Pl. 4 : 409. 1806.
Sagittaria variabilis Engelm. in A. Gray, Man. 461. 1848.

Monoecious or sometimes dioecious, glabrous or nearly so, scape stout or slender, 4′–4° tall, simple or branched. Leaves exceeding variable in form and size, sometimes linear-lanceolate and acuminate at the apex, sometimes wider than long and obtuse; basal lobes from ¼ to ½ as long as the blade; bracts acute, acuminate or obtuse, the upper ones sometimes united; flowers 1′–1½′ wide; filaments slender, glabrous; achene 1″–2″ long, broadly winged on both margins, its sides even or 1-ribbed, the beak about one-third its length, horizontal or nearly so.

In shallow water, throughout North America, except the extreme north, extending to Mexico. Variable. July–Sept.

Sagittaria latifòlia pubéscens (Muhl.) J. G. Smith, Mem. Torr. Club, 5 : 26. 1894.
Sagittaria pubescens Muhl. Cat. 86. 1813.

Whole plant pubescent, varying from merely puberulent to densely hirsute. Ontario to New Jersey, Florida and Alabama.

4. Sagittaria arifòlia Nutt. Arum-leaved Arrow-head. (Fig. 196.)

Sagittaria sagittaefolia var. *minor* Pursh, Fl. Am. Sept. 395. 1814?
Sagittaria arifolia Nutt.; J. G. Smith, Ann. Rep. Mo. Bot. Gard. 6: 32. *pl. 1.* 1894.

Glabrous or nearly so, terrestrial or partially submerged, scape weak, ascending, 8′–20′ long. Leaves sagittate, broad, acute at the apex, about as long as the scape, their margins slightly curved, their basal lobes acute or acuminate, one-fourth to one-third the length of the blade; petioles usually curving outwardly; bracts lanceolate, acute, usually equalling or longer than the fertile pedicels, often reflexed; filaments glabrous; petals 3″–5″ long; achene cuneate-obovate, about 1″ long, winged on both margins, the sides smooth, the beak short, erect.

Quebec to Minnesota and British Columbia, south to Michigan, western Kansas, New Mexico and California. Resembling in foliage the European *S. sagittaefolia* L., but distinguished from that species by its achenes.

5. Sagittaria cuneàta Sheldon. Floating Arrow-head. (Fig. 197.)

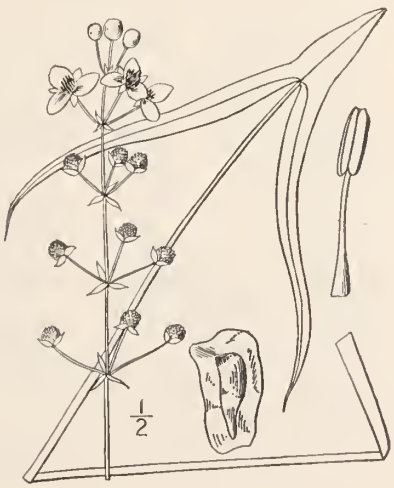
Sagittaria cuneata Sheldon, Bull. Torr. Club, 20: 283. *pl. 159.* 1893.

Aquatic, submerged, rooting in sand, scape very slender, simple, terete, 1°–2° long, bearing the flowers at the surface of the water. Leaves long-petioled, the blade floating, sagittate, linear-lanceolate, acuminate, 2′–4′ long, the basal lobes acuminate, about one-fourth its length; phyllodia of two kinds, one petiole-like and as long as the leaves, the other lanceolate, and clustered at the base of the plant; bracts ovate-lanceolate, acute, 2″–3″ long, much shorter than the slender fertile pedicels; flowers 6″–8″ broad; achene only ½″ long, obovate-cuneate, its beak very short, erect.

In shallow water, Minnesota to Washington and British Columbia. Aug.–Sept.

6. Sagittaria longíloba Engelm. Long-lobed Arrow-head. (Fig. 198.)

Sagittaria longiloba Engelm. in Torr. Bot. Mex. Bound. Surv. 212. 1859.



Monoecious, glabrous, scape slender, simple or rarely branched, 1°–2° tall. Leaves long-petioled, the apex acute, the basal lobes linear-lanceolate, acuminate, about three-fourths the length of the blade; bracts lanceolate, acuminate, 3″–4″ long, much shorter than the very slender fertile pedicels which are longer than the sterile ones; stamens numerous, the filaments longer than the anthers; achene about 1″ long, quadrate-obovate, somewhat broader above than below, winged on both margins, its beak exceedingly short.

In shallow water, Nebraska to Colorado, south to Texas and Mexico.

7. Sagittaria ambígua J. G. Smith. Kansas Sagittaria. (Fig. 199.)

Sagittaria ambigua J. G. Smith, Ann. Rep. Mo. Bot. Gard. 6 : 48. *pl. 17.* 1894.

Monoecious, glabrous, scape erect or ascending, simple or sparingly branched, 1°–2° high. Leaves lanceolate, entire, long-petioled, acute or acuminate at both ends, seemingly pinnately veined, really 5–7-nerved, 5′–8′ long, equalling or shorter than the scape; bracts lanceolate, acuminate, 5″–8″ long, much shorter than the slender fruiting pedicels, connate at the base, papillose; stamens 20–25; filaments glabrous, longer than the anthers; achene about 1″ long, oblong, curved, narrowly winged on both margins, its sides smooth and even, its beak short, oblique.

In ponds, Kansas and the Indian Territory.

8. Sagittaria lancifòlia L. Lance-leaved Sagittaria. (Fig. 200.)

Sagittaria lancifolia L. Amoen. Acad. 5 : 409. 1760.
Sagittaria falcata Pursh, Fl. Am. Sept. 397. 1814.
Sagittaria lancifolia falcata J. G. Smith, Mem. Torr. Club, 5 : 25. 1894.

Monoecious, glabrous, scape rigid, erect, stout or rather slender, striate, branched or simple, longer than the leaves. Leaves lanceolate or oblong-lanceolate, acute or acuminate at both ends, firm, entire, the blades 5–9-nerved, 8′–1½° long, gradually narrowed into the long petioles, apparently pinnately veined; flowers numerous, 5″–12″ broad; bracts ovate or ovate-lanceolate, usually not united at the base, glabrous or nearly so, equalling or shorter than the fruiting pedicels; stamens numerous; filaments cobwebby-pubescent, equalling or longer than the anthers; achene narrowly obovate-cuneate, 1″–1½″ long, winged on both margins, its sides smooth, its beak tapering, oblique.

In swamps and shallow water, Delaware, to Florida and Texas, near the coast. Widely distributed in tropical America.

9. Sagittaria rígida Pursh. Sessile-fruiting Arrow-head. (Fig. 201.)

Sagittaria rigida Pursh, Fl. Am. Sept. 397. 1814.
Sagittaria heterophylla Pursh, Fl. Am. Sept. 396. 1814. Not Schreb. 1811.

Monoecious, glabrous, scape simple, weak, curving, ascending or decumbent, shorter than the leaves. Leaves very variable, linear, lanceolate, elliptic or broadly ovate, acute or obtuse at the apex, entire or with 1 or 2 short or slender basal lobes; bracts ovate, obtuse, 2″–4″ long, united at the base or sometimes distinct; heads of fruit sessile or very nearly so; pedicels of the sterile flowers ½′–1′ long; filaments dilated, mostly longer than the anthers, pubescent; achene narrowly obovate, 1½″–2″ long, winged on both margins, crested above, tipped with a stout nearly erect beak of about one-fourth its length.

In swamps and shallow water, Quebec to Minnesota, south to New Jersey, Tennessee, Missouri and Nebraska. Petioles rigid when growing in running water. July–Sept.

10. Sagittaria tères S. Wats. Slender Sagittaria. (Fig. 202.)

Sagittaria teres S. Wats. in A. Gray, Man. Ed. 6, 555. 1890.

Monoecious, glabrous, scape slender, erect, simple, 6′–18′ long, bearing only 1–3 verticils of flowers. Leaves usually reduced to elongated terete nodose phyllodia or some of them short and bract-like, one or two of the longer ones occasionally bearing a linear blade; bracts ovate, obtuse, about 1½″ long, much shorter than the filiform fruiting pedicels which are longer than the sterile ones; flowers 6″–8″ broad; stamens about 12, their dilated filaments pubescent, shorter than the anthers; achene broadly obovate, 1″ long, the ventral margin winged, the dorsal 7–11-crested, the sides bearing several crenate crests, the beak short, erect.

In ponds, Massachusetts to South Carolina. Aug.–Sept.

11. Sagittaria cristàta Engelm. Crested Sagittaria. (Fig. 203.)

Sagittaria cristata Engelm.; Arthur, Proc. Davenport Acad. 4 : 29. 1882.

Monoecious, scape slender, erect, 1°–2½° high, simple, bearing 4 or 5 verticils of flowers at or above the surface of the water. Leaves long-petioled, spongy and rigid, reduced to slender phyllodia or bearing linear-lanceolate or elliptic blades 2′–4′ long and 3″–12″ wide; bracts acute, 2″–4″ long, much shorter than the slender fertile pedicels; flowers 8″–10″ broad; stamens about 24; filaments dilated, pubescent, at least at the middle, longer than the anthers; achene obliquely obovate, the dorsal margin with a broad crenate wing, the ventral straight-winged, each side bearing 2 crenate crests, the beak short, oblique.

In shallow water, Iowa and Minnesota. Phyllodia are commonly developed from the nodes of the rootstock. July–Aug.

12. Sagittaria gramínea Michx. Grass-leaved Sagittaria. (Fig. 204.)

Sagittaria graminea Michx. Fl. Bor. Am. 2 : 190. 1803.

Monoecious or dioecious, glabrous, scape simple, erect, 4′–2° tall. Leaves long-petioled, the blades linear, lanceolate or elliptic, acute at both ends, 2′–6′ long, ½″–3″ wide, 3–5-nerved, the nerves distinct to the base, some of them occasionally reduced to flattened phyllodia; bracts ovate, acute, 1½″–3″ long, much shorter than the slender or filiform fruiting pedicels, connate to the middle or beyond; flowers 4″–6″ broad; stamens about 18; filaments dilated, pubescent, longer than or equalling the anthers; achene obovate, ½″–1″ long, slightly wing-crested on the margins and ribbed on the sides, the beak very short.

In mud or shallow water, Newfoundland to Ontario and South Dakota, south to Florida and Texas. Early leaves often purplish. July–Sept.

13. Sagittaria platyphýlla (Engelm.) J. G. Smith. Ovate-leaved Sagittaria. (Fig. 205.)

Sagittaria graminea var. *platyphylla* Engelm. in A. Gray, Man. Ed. 5, 494. 1867.
Sagittaria platyphylla J. G. Smith, Ann. Rep. Mo. Bot. Gard. 6 : 55. *pl. 26.* 1894.

Monoecious, glabrous, scape erect, simple, rather weak, mostly shorter than the leaves. Leaves rigid, the blades ovate, ovate-lanceolate or ovate-elliptic, short-acuminate or acute at the apex, rounded, gradually narrowed or rarely cordate or hastate at the base, seemingly pinnately veined, 2′–6′ long; bracts broadly ovate, acute, connate at the base, 2″–4″ long; flowers 8″–14″ broad; fertile pedicels stout, divergent in flower, reflexed in fruit, ½′–2½′ long; filaments dilated, pubescent, rather longer than the anthers; achene obliquely obovate, winged on both margins, the dorsal margin somewhat crested, the sides with a sharp wing-like ridge.

In swamps and shallow water, southern Missouri to Mississippi and Texas. Phyllodia, when present, oblong or oblanceolate. July–Sept.

14. Sagittaria subulàta (L.) Buchenau. Subulate Sagittaria. (Fig. 206.)

Alisma subulata L. Sp. Pl. 343. 1753.
Sagittaria pusilla Nutt. Gen. 2 : 213. 1818.
Sagittaria subulata Buchenau, Abh. Nat. Ver. Bremen, 2 : 490. 1871.

Monoecious or rarely dioecious, scape very slender, 2′–6′ high, few-flowered, about equalling the leaves. Leaves all reduced to rigid phyllodia or sometimes bearing linear or linear-lanceolate blades, 1′–1½′ long; bracts united to the apex or becoming partly separated; flowers 5″–8″ broad; fertile pedicels reflexed and much longer than the bracts in fruit; stamens about 8; filaments about equalling the anthers, dilated, glabrous; achenes rather less than 1″ long, obovate, narrowly winged, with 2 or 3 crests on each side, the wings and crests sometimes crenate; beak short.

In tide-water mud, southern New York and Pennsylvania to Florida and Alabama. July–Sept.

Sagittaria subulàta gracillima (S. Wats.) J. G. Smith, Mem. Torr. Club, 5 : 26. 1894.
Sagittaria natans var. (?) *gracillima* S. Wats. in A. Gray, Man. Ed. 6, 556. 1890.
Submerged; leaves 2°–4° long, bladeless or bearing small 3-nerved lanceolate blades, 1′–2′ long, 3″–4″ wide; scape simple, terete or compressed, about as long as the leaves; flowers few, 8″–10″ broad. Eastern Massachusetts and Rhode Island. Perhaps a distinct species. Fruit not seen.

Family 6. VALLISNERIÀCEAE Dumort. Anal. Fam. 54. 1829.

Tape-Grass Family.

Submerged or floating aquatic herbs, the leaves various. Flowers regular, mostly dioecious, appearing from an involucre or spathe of 1–3 bracts or leaves. Perianth 3–6-parted, the segments either all petaloid or the 3 outer ones small and herbaceous, the tube adherent to the ovary at its base in the pistillate flowers. Stamens 3–12, distinct or monadelphous. Anthers 2-celled. Ovary 1-celled with 3 parietal placentae or 6–9-celled. Styles 3–9, with entire or 2-cleft stigmas. Ovules anatropous or orthotropous. Fruit ripening under water, indehiscent. Seeds numerous, without endosperm.

About 14 genera and 40 species of wide distribution in warm and temperate regions. Besides the following, another genus, *Halophila*, occurs on the coast of Florida.

Stem branched; leaves whorled or opposite. 1. *Philotria.*
Acaulescent; stoloniferous; leaves grass-like, elongated. 2. *Vallisneria.*
Stem stoloniferous; leaves broad, rounded, cordate, petioled. 3. *Limnobium.*

1. PHILÒTRIA Raf. Am. Month. Mag. 2: 175. 1818.

[ELODEA Michx. Fl. Bor. Am. 1: 20. 1803. Not *Elodes* Adans. 1763.]
[UDORA Nutt. Gen. 2: 242. 1818.]

Stems submerged, elnogated, branching, leafy. Leaves opposite or whorled, crowded, 1-nerved, pellucid, minutely serrulate or entire. Flowers dioccious or polygamous, arising from an ovoid or tubular 2-cleft spathe. Perianth 6-parted, at least the 3 inner segments petaloid. Staminate flowers with 9 stamens, the anthers oblong, erect. Ovary 1-celled with 3 parietal placentae. Stigmas 3, nearly sessile, 2-lobed. Fruit oblong, coriaceous, few-seeded. [Name from the Greek, referring to the leaves, which are often whorled in threes.]

About 8 species, inhabitants of fresh water ponds and streams in temperate and tropical America.

1. Philòtria Canadénsis (Michx.) Britton. Water-weed. Ditch-moss. Water Thyme. (Fig. 207.)

Elodea Canadensis Michx. Fl. Bor. Am. 1: 20. 1803.
Anacharis Canadensis Planch. Ann. Sci. Nat. (III. 9: 75. 1849.
Philotria Canadensis Britton, Science (II.) 2: 5. 1895.

Stems 4′–3° long, according to the depth of water. Leaves linear or elliptic, acute or obtuse, serrulate or entire, verticillate in 3's or 4's or the lower opposite, 2″–7″ long, ½″–2″ wide; flowers axillary, white, the staminate minute, sessile, breaking off at the time of flowering and rising to the surface where they shed their pollen around the pistillate ones; pistillate flowers expanding on the surface of the water which they reach by means of the slender calyx-tube which varies in length from 2′–1°, their spathes 5″–7″ long; stigmas spreading, papillose or pubescent.

Nearly throughout North America, except the extreme north. Naturalized in Europe. It has been maintained that there are four North American species. May–Aug.

2. VALLISNÈRIA L. Sp. Pl. 1015. 1753.

Aquatic dioecious submerged perennials, with long grass-like floating leaves. Staminate flowers with a 2–3-parted spathe on a short scape, numerous, nearly sessile on a conic receptacle; perianth 3-parted; stamens generally 2 (1–3). Pistillate flowers on a very long flexuous or spiral scape, with a tubular, 2-cleft, 1-flowered spathe; perianth-tube aduate to the ovary, 3-lobed and with 3 small petals; ovary 1-celled with 3 parietal placentae; stigmas 3, nearly sessile, short, broad, 2-toothed with a minute process just below each sinus; ovules unmerous, borne all over the ovary-wall, orthotropous. Fruit elongated, cylindric, crowned with the perianth. [Named for Antonio Vallisneri, 1661–1730, Italian naturalist.]

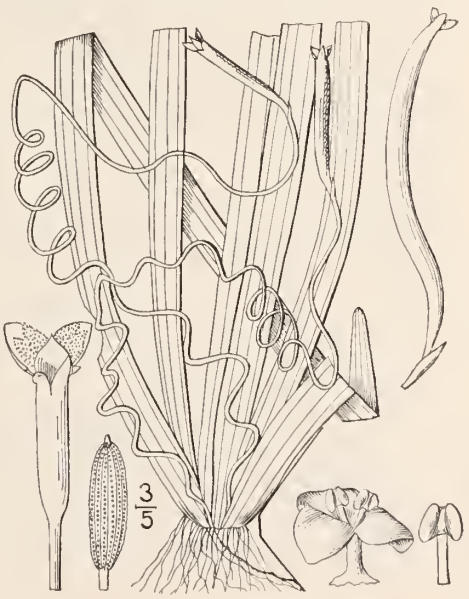
A monotypic genus of wide distribution both in the Old World and the New.

1. Vallisneria spiràlis L. Tape-grass. Eel-grass. (Fig. 208.)

Vallisneria spiralis L. Sp. Pl. 1015. 1753.

Plant rooting in the mud or sand, stoloniferous. Leaves thin, narrowly linear, 5-nerved, obtuse, sometimes serrate near the apex, ½°–6° long, 2″–9″ wide, the 2 marginal nerves faint; the staminate bud separates from the scape at the time of flowering and expands upon the surface of the water; pistillate flowers upon a long thread-like scape, the spathe ½′–1′ long, enclosing a single white flower; ovary as long as the spathe; after receiving the pollen from the staminate flowers the scape of the pistillate contracts spirally; ripe fruit 2′–7′ long.

In quiet waters, New Brunswick to Florida, west to Minnesota, Iowa and Texas. The "wild celery" of Chesapeake Bay, and a favorite food of the canvas-back duck. Aug.–Sept.



3. LIMNÒBIUM L. C. Richard, Mem. Inst. Paris, 32: 66. *pl. 8.* 1811.

Aquatic, stoloniferous herbs, the leaves fascicled at the nodes, petioled, broad, cordate. Flowers monoecious, white, arising from sessile or stipitate, 2-leaved, membranous spathes. Perianth 6 parted, the segments petaloid, the 3 outer oblong-oval, the 3 inner oblong-linear. Staminate flowers 2–4 in a spathe, long-peduncled, the stamens united in a column bearing 6–12 anthers at different heights, sometimes producing only 9–12 staminodia, the filaments tipped with abortive anthers. Pistillate flowers sessile or short-peduncled with 3–6 vestigial stamens; ovary 6–9-celled with as many central placentae; stigmas as many as the cells, each 2-parted. Fruit a many-seeded berry. [Greek referring to the aquatic habitat.]

Three or four species, natives of America.

1. Limnobium Spóngia (Bosc.) L. C. Richard. Frog's-bit. (Fig. 209.)

Hydrocharis Spongia Bosc, Ann. Mus. Paris, 9: 396. *pl. 30.* 1807.
Limnobium Spongia L. C. Richard, Mem. Inst. Paris, 32: 66. *pl. 8.* 1811.
Hydrocharis cordifolia Nutt. Gen. 2: 241. 1818.
Limnocharis Spongia L. C. Richard; Steud. Nomencl. Ed. 2, Part. 2, 45. 1841.

Blades of the leaves orbicular or broadly ovate, cordate or reniform, faintly 5–7-nerved and cross-veined, purplish and spongy beneath, 10″–2′ broad, on petioles 1′–10′ in length. Stolons rooting and sending up flowers and leaves at the nodes; peduncles of the staminate flowers 3′–4′ long, those of the pistillate flowers stouter, 1′–2′ long, nodding in fruit.

In shallow, stagnant water, Lake Ontario, to Florida, west to Illinois, Missouri and Louisiana. July–Aug.

Family 7. GRAMÍNEAE Juss. Gen. 28. 1789.*

GRASS FAMILY.

Annual or perennial herbs, of various habit, rarely shrubs or trees. Culms (stems) generally hollow, but occasionally solid, the nodes closed. Leaves sheathing, the sheaths usually split to the base on the side opposite the blade; a scarious or cartilaginous ring, naked or hairy, rarely wanting, called the ligule, is borne at the orifice of the sheath. Inflorescence spicate, racemose or paniculate, consisting of spikelets composed of two to many 2-ranked imbricated bracts, called scales (glumes), the two lowest in the complete spikelet always empty, one or both of these sometimes wanting. One or more of the upper scales, except sometimes the terminal ones, contains in the axil a flower, which is usually enclosed by a bract-like awnless organ called the palet, placed opposite the scale and with its back toward the axis (rachilla) of the spikelet, generally 2-keeled; sometimes the palet is present without the flower, and vice versa. Flowers perfect or staminate, sometimes monoecious or dioecious, subtended by 1–3 minute hyaline scales called the lodicules. Stamens 1–6, usually 3. Anthers 2-celled, versatile. Ovary 1-celled, 1-ovuled. Styles 1–3, commonly 2 and lateral. Stigmas hairy or plumose. Fruit a seedlike grain (caryopsis). Endosperm starchy.

About 3500 species, widely distributed throughout the world, growing in water and on all kinds of soil. Those yielding food-grains are called cereals. The species are more numerous in tropical countries, while the number of individuals is much greater in temperate regions, often forming extended areas of turf. The time of year noted is that of ripening seed.

KEY TO THE TRIBES AND GENERA.

A. Spikelets 1 or 2-flowered, when 2-flowered the upper fertile, lower staminate; rachilla articulated below the scales or the subtending involucre, and not extending beyond the flowers.

Spikelets not flattened laterally.

Flowering scale and palet hyaline; none of the scales spiny.

Spikelets monoecious; staminate and pistillate in the same panicle. I. MAYDEAE.

Spikelets perfect, or one staminate or rudimentary, mostly silky. II. ANDROPOGONEAE.

Flowering scale and palet membranous; second scale spiny (in ours). III. ZOYSIEAE.

Flowering scale and palet coriaceous or chartaceous; spikelets mostly glabrous, involucrate in Nos. 13 and 14; scales 3 or 4. IV. PANICEAE.

Spikelets flattened laterally, 1-flowered; scales 2. V. ORYZEAE.

*This family has been elaborated with the assistance of MR. GEO. V. NASH.

B. Spikelets 1-many-flowered; rachilla generally articulated above the two lower scales (below them in Nos. 32, 40, 48 and 54) and frequently extending beyond the flower in 1-flowered spikelets.

Culms herbaceous.
Spikelets upon pedicels in panicles, spike-like panicles or racemes, not in rows.
Spikelets with but 1 perfect flower, which is terminal except in 37 and part of 36.
Empty scales 4 (except in No. 20); palet 1-nerved. VI. PHALARIDEAE.
Empty scales 2; palet 2-nerved. VII. AGROSTIDEAE.
Spikelets with 2 or more perfect flowers (except that one is staminate in Nos. 40 and 45); upper flower often imperfect.
Flowering scales generally shorter than the empty lower ones, usually with a bent awn on the back. VIII. AVENEAE.
Flowering scales generally longer than the empty lower ones, unawned or with a straight awn from the apex. X. FESTUCEAE.
Spikelets in two rows, forming a one-sided spike or raceme. IX. CHLORIDEAE.
Spikelets in two opposite rows, forming an equilateral spike (unilateral in *Nardus*). XI. HORDEAE.
Culms woody, at least at the base; tall reeds. XII. BAMBUSEAE.

Tribe I. MAYDEAE.

Fertile spikelets imbedded in the joints of the thick rachis. 1. *Tripsacum.*

Tribe II. ANDROPOGONEAE.

Joints of the rachis not much thickened nor excavated for the reception of the spikelets.
Spikelets alike, perfect, one sessile, one pedicelled. 2. *Erianthus.*
Spikelets not alike, the sessile perfect, the pedicelled staminate, empty or wanting.
Inflorescence composed of spike-like silky racemes. 4. *Andropogon.*
Inflorescence paniculate; spikelets silky.
Pedicelled spikelet wanting (in our species). 5. *Chrysopogon.*
Pedicelled spikelet present and usually staminate. 6. *Sorghum.*
Joints of the rachis greatly thickened and excavated for the reception of the spikelets. 3. *Manisuris.*

Tribe III. ZOYSIEAE.

Spikelets in a terminal spike; second scale spiny. 7. *Nazia.*

Tribe IV. PANICEAE.

Spikelets without a subtending involucre of bristles or valves.
Scales 3.
Spikelets all alike in close 1-sided spikes.
Spikelets with a swollen ring-like callus at the base. 10. *Eriochloa.*
Spikelets without a callus. 8. *Paspalum.*
Spikelets of two kinds, one borne in loose linear panicles, the other solitary on subterranean peduncles and maturing seed. 9. *Amphicarpon.*
Scales 4, rarely 3 by suppression of the lowest one.
Spikelets in 2's or 3's on one side of a long and slender flat or 3-angled rachis; spikes digitate or approximate in whorls. 11. *Syntherisma.*
Spikelets single, pedicelled, in panicles or raceme-like sessile and panicled spikes; first scale short, third empty or staminate, fourth fertile. 12. *Panicum.*
Spikelets subtended by an involucre consisting of:
1-many persistent bristles; spikelets in dense spikes, deciduous. 13. *Ixophorus.*
2 spine-bearing valves forming a bur enclosing the spikelets and deciduous with them. 14. *Cenchrus.*

Tribe V. ORYZEAE.

Spikelets monoecious; tall aquatic grasses.
Pistillate spikelets ovate, borne at the base of each branch of the panicle. 15. *Zizaniopsis.*
Pistillate spikelets linear, borne on the upper branches of the panicle. 16. *Zizania.*
Spikelets not monoecious; grasses of swamps or wet grounds. 17. *Homalocenchrus.*

Tribe VI. PHALARIDEAE.

Third and fourth scales
small and empty or rudimentary, not awned; stamens 3. 18. *Phalaris.*
empty, awned upon the back; stamens 2. 19. *Anthoxanthum.*
subtending staminate flowers with 3 stamens; fertile flowers with 2 stamens. 20. *Savastana.*

Tribe VII. AGROSTIDEAE.

Flowering scale indurated at maturity, of firmer texture than the empty scales, and closely enveloping the grain.
Rachilla not prolonged beyond the palet.
Flowering scale with a three-branched awn; stamens mostly 3. 21. *Aristida.*
Flowering scale with a simple awn.
Flowering scale narrow; awn persistent.
Awn tortuous or twisted, stout; callus evident. 22. *Stipa.*
Awn straight, very slender; callus minute. 25. *Muhlenbergia.*
Flowering scale broad; awn slender, straight, deciduous; callus obtuse. 23. *Oryzopsis.*
Flowering scale awnless. 24. *Milium.*
Rachilla with a pedicel-like extension beyond the palet; stamens 2. 26. *Brachyelytrum.*

Flowering scale hyaline or membranous at maturity; empty scales coarser; grain loose.
Spikelets in a dense spike-like panicle. (Some species of No. 31 may be looked for here.)
Spikelets 3″ or less long.
Spikelets readily deciduous at maturity.
Empty scales not awned. 29. *Alopecurus.*
Empty scales awned. 32. *Polypogon.*
Spikelets not deciduous; empty scales persistent.
Flowering scales slightly exceeding the empty ones. 27. *Heleochloa.*
Flowering scales much shorter than the empty ones. 28. *Phleum.*
Spikelets 5″–6″ long; tall seashore grasses. 37. *Ammophila.*
Spikelets variously panicled; panicle not spike-like, except in a few species of No. 31.
Seed loosely enclosed in the pericarp, which opens readily at maturity.
Empty scales minute; low arctic grass. 30. *Phippsia.*
Empty scales not minute; no callus, awns or hairs. 31. *Sporobolus.*
Seed adherent to the pericarp.
Palet 1-nerved; stamen 1; flower plainly stalked; scales not hairy. 34. *Cinna.*
Palet 2-nerved; stamens 3; flower not plainly stalked.
Flowering scale bifid, with a delicate awn on its back; rachilla prolonged into a short bristle. 39. *Apera.*
Flowering scale entire; rachilla not prolonged into a bristle.
Callus with a tuft of long hairs at the base (except in species of genus 36).
Rachilla extended beyond the palet. 36. *Calamagrostis.*
Rachilla not extended beyond the palet. 38. *Calamovilfa.*
Callus naked, or with very short hairs.
Empty scales somewhat shorter than the flowering ones; arctic grass. 33. *Arctagrostis.*
Empty scales longer than the flowering ones; panicle open; spikelets small. 35. *Agrostis.*

Tribe VIII. AVENEAE.

Spikelets deciduous; lower flower perfect, upper staminate, awned; plant velvety. 40. *Holcus.*
Spikelets not deciduous; empty scales persistent, flowering ones deciduous.
Spikelets of 2 perfect flowers; rachilla not prolonged beyond the upper one. 41. *Aira.*
Spikelets 2-many-flowered; rachilla prolonged beyond the upper flower.
Awn of flowering scale upon the back, inserted below the teeth.
Flowers all perfect, or the upper ones staminate or wanting.
Spikelets less than 6″ long; grain free, unfurrowed.
Flowering scale finely erose-dentate or 2-lobed. 42. *Deschampsia.*
Flowering scale cleft or 2-toothed, with the teeth sometimes produced into awns. 43. *Trisetum.*
Spikelets over 6″ long; grain furrowed, usually adherent to the scales. 44. *Avena.*
Upper flower perfect, lower staminate, its scale strongly awned. 45. *Arrhenatherum.*
Awn from between the lobes or teeth of the flowering scale, generally twisted. 46. *Danthonia.*

Tribe IX. CHLORIDEAE.

Flowers perfect or some of them rudimentary.
1 perfect flower in each spikelet; sometimes 2 in Nos. 53 and 54.
No empty scales above the flower.
Spikelets deciduous.
Rachis produced beyond the upper spikelet; spikelets narrow. 48. *Spartina.*
Rachis not so produced; spikelets globose, sometimes 2-flowered. 54. *Beckmannia.*
Spikelets not deciduous; empty scales persistent; low slender grasses.
Spikes 2–6, slender, digitate, 1′–2′ long. 47. *Capriola.*
Spikes many along a common axis, 2′–4′ long. 52. *Schedonnardus.*
One–several empty scales above the flower.
Lower empty scales 4; spike solitary, dense. 49. *Campulosus.*
Lower empty scales 2.
Spikes in false whorls or closely approximate; scales long-awned. 50. *Chloris.*
Spikes remote, or the lowest only approximate.
Spikelets scattered or remote on filiform spikes. 51. *Gymnopogon.*
Spikelets crowded, sometimes 2-flowered. 53. *Bouteloua.*
2–3 perfect flowers in each spikelet.
Spikelets densely crowded; spikes usually digitate.
Spikes with terminal spikelets. 55. *Eleusine.*
Spikes without terminal spikelets, the rachis extending beyond them into a point. 56. *Dactyloctenium.*
Spikelets distinctly alternating; spikes remote. 57. *Leptochloa.*
Spikelets dioecious, very unlike; spikes short; low prairie grass. 58. *Bulbilis.*

Tribe X. FESTUCEAE.

Rachilla with long hairs enveloping the flowering scale; tall aquatic grass. 60. *Phragmites.*
Rachilla and flowering scales naked or hairy, hairs much shorter than the scales.
Stigmas barbellate; spikelets in clusters of 3–6 in the axils of stiff spinescent leaves. 59. *Munroa.*
Stigmas plumose; spikelets not in the axils of leaves; inflorescence various.
Spikelets of two forms, the fertile 1–3-flowered, surrounded by the sterile, consisting of many empty pectinate scales. 76. *Cynosurus.*
Spikelets all alike.
Flowering scale 2–3-toothed or pointed, usually 3-nerved; lateral nerves and callus (an enlargement of the rachilla just below the flowering scale) generally hairy.
Spikelets with 3-many fertile flowers. 61. *Sieglingia.*
Spikelets 1–3-flowered; flowering scales keeled; branches of the diffuse panicle long and capillary. 62. *Redfieldia.*

Flowering scale of some other structure.
Flowering scales 1–3-nerved, all with perfect flowers or the uppermost with a staminate flower only or empty.
Panicle branches spirally arranged
Panicle branches simple, in spike-like racemes. 63. *Diplachne.*
Branches of the panicle mostly again divided.
Spikelets loosely 2–4-flowered; conical rachilla articulated. 64. *Molinia.*
Spikelets densely 2–70-flowered; rachilla not articulated; ligule or throat of sheath bearded. 65. *Eragrostis*
Primary branches of the panicle distichous, usually branched again at the base.
Panicle spike-like or much contracted.
Second scale broader than the 2 flowering ones. 66. *Eatonia.*
Second scale not broader than the 3–7 flowering ones. 67. *Koeleria.*
Panicle diffuse, with long slender branches. 68. *Catabrosa.*
Flowering scales 3–many-nerved, with 2 or more of the upper scales empty, appressed, convolute around each other.
Stamens 3; upper sterile scales usually club-shaped. 69. *Melica.*
Stamens 1–2; sterile scales not club-shaped. 70. *Koeleriarpus.*
Flowering scales 5–many-nerved, each with a perfect flower, or the upper sometimes abortive.
Keel of the palet winged or with a linear appendage. 71. *Pleuraphoron.*
Keel of the palet not appendaged.
Scales more or less strongly compressed and keeled.
Empty basal scales 3–6; spikelets flat, 2-edged. 72. *Uniola.*
Empty basal scales 2; spikelets flattened.
Panicle contracted; spikelets dioecious. 73. *Distichlis.*
Panicle open; spikelets perfect.
Flowering scales herbaceous, awn-pointed; spikelets collected in one-sided clusters. 75. *Dactylis.*
Flowering scales scarious-margined; rachis glabrous or with webby hairs.
Spikelets large, cordate. 74. *Briza.*
Spikelets mostly smaller, not cordate.
Empty scales projecting beyond the uppermost flowering ones, arctic grass. 78. *Dupontia.*
Uppermost scales exceeding the empty ones; flowering scales 2–10, mostly webby at base. 77. *Poa.*
Flowering scales membranous; rachis hirsute with stiff hairs, extended into a hairy appendage. 80. *Graphephorum.*
Scales rounded on the back, at least below.
Stigmas placed at or near the apex of the ovary.
Flowering scales with a basal ring of hairs, prominently 7-nerved, toothed at apex; water grass. 79. *Scolochloa.*
Flowering scales naked at the base:
Obtuse or subacute and scarious at the apex, usually toothed.
Plainly 5–7-nerved; styles present. 81. *Panicularia.*
Obscurely 5-nerved; no style or awns. 82. *Puccinellia.*
Acute, pointed or awned at apex; not webby. 83. *Festuca.*
Stigmas plainly arising below the apex of the ovary; spikelets large, usually drooping; scales mostly awned. 84. *Bromus.*

Tribe XI. HORDEAE.

Stigma 1; spike unilateral; spikelets 1-flowered, narrow. 85. *Nardus.*
Stigmas 2; spike symmetrical.
Spikelets solitary at the notches of the rachis.
Flowering scales with their backs turned to the rachis. 86. *Lolium.*
Flowering scales with their sides turned to the rachis.
Spikelets 1–2-flowered in slender articulate spikes. 87. *Lepturus.*
Spikelets 2–many-flowered in stout inarticulate spikes. 88. *Agropyron.*
Spikelets 2–6 at each joint of the rachis; scales mostly long-awned.
Spikelets 1-flowered or with the rudiment of a second flower. 89. *Hordeum.*
Spikelets 2–many-flowered.
Empty scales a little smaller than the flowering ones. 90. *Elymus.*
Empty scales very small or none. 91. *Hystrix.*

Tribe XII. BAMBUSEAE.

Tall canes with large flat spikelets in panicles or racemes. 92. *Arundinaria.*

1. TRÍPSACUM L. Syst. Ed. 10, 2: 1261. 1759.

[DIGITARIA Heist.; Adans. Fam. Pl. 2: 38. 1763.]

Tall perennial grasses with thick rootstocks, rather broad flat leaves and monoecious flowers. Spikelets 1–2-flowered, in terminal or axillary, solitary or clustered, elongated spikes. Staminate spikelets in 2's at each node of the axis, 2-flowered, consisting of four scales, the two outer coriaceous, the two inner thinner, the palet hyaline; stamens 3. Pistillate spikelets in excavations at the lower joints of the spike, 1-flowered; stigmas exserted; style slender. Grain partly enclosed in the excavations of the spikes, covered in front by the horny exterior lower scale. [Name from the Greek, in allusion to the polished outer scales.]

About 3 species, natives of tropical and temperate America. Besides the following, another occurs in the southern United States.

1. Tripsacum dactyloides L. Gama Grass. (Fig. 210.)

Coix dactyloides L. Sp. Pl. 972. 1753.
Tripsacum dactyloides L. Sp. Pl. Ed. 2, 1378. 1763.
Tripsacum dactyloides var. *monostachyum* A. Gray, Man. 616. 1848.

Rootstock ½′–1′ thick, culms stout, erect, 4°–8° tall. Leaves smooth and glabrous, 1° or more long, ½′–1½′ wide, long-acuminate, truncate or subcordate at the base; spikes terminal and in the upper axils, solitary or 2–3 together, 4′–9′ long, the lower spikelets pistillate, the upper staminate and very numerous; outer scales of the staminate spikelets linear and obtuse, 4″ long, about 1″ wide, faintly many-nerved; exterior scale of the pistillate spikelets horny, shining, closely appressed in fruit.

In swamps or along streams, Connecticut to Florida, Texas and Mexico, north to Illinois, Missouri and Kansas. Also in South America. One of our largest grasses, sometimes used for fodder. June–Sept.

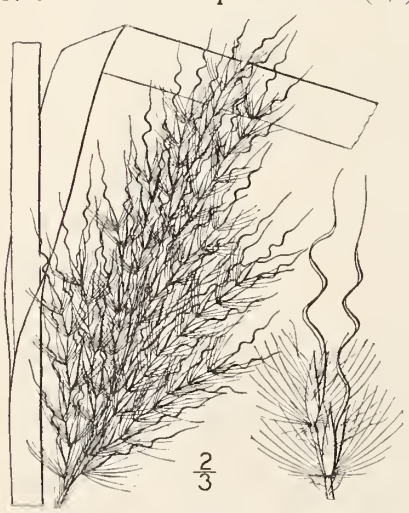
2. ERIÁNTHUS Michx. Fl. Bor. Am. 1: 54. 1803.

Tall generally robust perennial grasses, with thick creeping rootstocks, long flat leaves, and perfect flowers in terminal panicles. Spikelets generally with a ring of hairs at the base, 2 at each node of the jointed rachis, one sessile, the other with a pedicel, generally 1-flowered. Scales 4, the two outer indurated, the inner hyaline, the fourth bearing a terminal straight or contorted awn; palet small, hyaline; stamens 3. Grain oblong, free, enclosed in the scales. [Greek, referring to the woolly spikelets.]

About 17 species, natives of the temperate and tropical regions of both hemispheres. Besides the following, two others occur in the Southern States.

Awn spiral. 1. *E. alopecuroides.*
Awn straight.
Panicle lax; branches long and spreading; basal hairs longer than the outer scale of the spikelet. 2. *E. saccharoides.*
Panicle compact or strict; branches short and erect or appressed; basal hairs equalling or shorter than the outer scale of the spikelet.
Outer scale about 2½″ long. 3. *E. compactus.*
Outer scale about 4″ long. 4. *E. brevibarbis.*

1. Erianthus alopecuroides (L.) Ell. Spiral-awned Beard-grass. (Fig. 211.)



Andropogon alopecuroides L. Sp. Pl. 1045. 1753.
Erianthus alopecuroides Ell. Bot. S. C. & Ga. 1: 38. 1816. In part.

Culms stout, erect, 6°–10° tall; nodes naked or barbed, the summit and the axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous; leaves usually glabrous, 6′–2° long, ½′–1′ wide, acuminate, narrowed and sometimes hairy on the upper surface near the base; panicle oblong, 7′–12′ long, 2′–3′ wide, branches spreading, 3′–5′ long, slender, loose, internodes about 2″ long; outer scales of the spikelet about 3″ long, exceeding the pedicel and about two-thirds as long as the basal hairs, lanceolate, acuminate; inner scales shorter, the awn 6″–8″ long, scabrous, the portion included in the outer scales tightly spiral, bent at point of exsertion, and thence loosely spiral.

In damp soil, North Carolina to Kentucky and Missouri, south to Georgia and Alabama. Comparison with the original specimens of Linnaeus proves that the name *alopecuroides* belongs to this species. Sept.

2. Erianthus saccharoides Michx. Plume Grass. (Fig. 212.)

Erianthus saccharoides Michx. Fl. Bor. Am. 1: 55. 1803.

Culms robust, erect, 5°–10° tall, barbed at the nodes, the summit and the axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous or sparingly hairy below, densely pubescent at the throat with long more or less spreading silky hairs; leaves scabrous or appressed-pubescent, 6′–2° long, ¼′–1′ wide, long-acuminate, somewhat narrowed towards the base; panicle lax, broadly oblong, 5′–15′ long, 2′–4′ wide, its branches spreading, 2′–4′ long, slender, internodes about 2″ long; outer scales of the spikelet about 2″ long, a little exceeding the pedicel and about one-half as long as the basal hairs, lanceolate, acuminate; inner scales shorter, the awn 10″–12″ long, straight, scabrous.

In moist sandy soil, southeastern Virginia to Florida and Louisiana. Also in Cuba. Aug.–Sept.

3. Erianthus compáctus Nash. Contracted Plume-grass. (Fig. 213.)

Erianthus compactus Nash, Bull. Torr. Club, 22: 419. 1895.

Culms erect, 4°–8° tall, stout, the nodes barbed, the summit and axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous, or pubescent at the top; leaves scabrous above, sparingly appressed-pubescent beneath, 6′–2° long, 3″–6″ wide, long-acuminate, narrowed toward the base; panicle narrowly oblong, 4′–6′ long, about 1½′ wide; branches erect, 1′–2′ long; spikelets crowded; internodes about 1″ long; outer scales of the spikelet about 2½″ long, exceeding the pedicels and about equalling the basal hairs, lanceolate, acuminate; inner scales shorter, the awn 5″–10″ long, straight, scabrous.

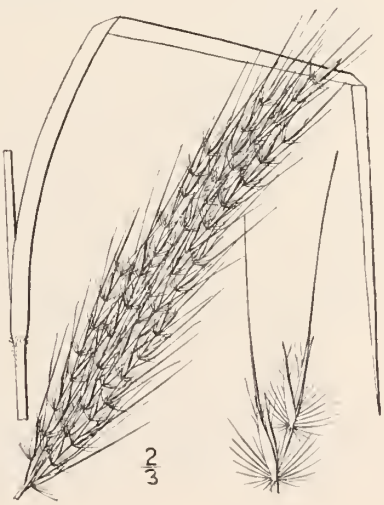
In moist soil, New Jersey to North Carolina and Tennessee. Aug.–Sept.

4. Erianthus brevibàrbis Michx. Short-bearded Plume-grass. (Fig. 214.)

Erianthus brevibarbis Michx. Fl. Bor. Am. 1: 55. 1803.
Erianthus saccharoides Michx. sub-sp. *brevibarbis* Hack. in DC. Monog. Phan. 6: 131. 1889.

Culms stout, erect, 4°–5° tall, nodes naked or scantily barbed, the summit and axis of the panicle smooth or scabrous. Sheaths glabrous; leaves rough, 12′–18′ long, 3″–5″ wide, acuminate; panicle linear-oblong, 8′–10′ in length, 1′–1½′ wide, branches erect, 2′–5′ long, internodes about 2½″ long; outer scales of the spikelet about 4″ long, twice the length of the pedicel and equalling or twice as long as the basal hairs, lanceolate, long-acuminate; inner scales shorter; awn 9″–12″ long, straight, scabrous.

In moist soil, Virginia (according to Watson) to North Carolina and Louisiana. Autumn.



3. MANISÙRIS L. Mant. 2: 164. 1771.

[ROTTBOELLIA L. f. Dissert. Nova Gram. Gen. 23. 1779.]

Mostly tall perennials, with running rootstocks, narrow flat leaves and cylindrical jointed spikes, terminal and from the upper axils. Spikelets in pairs at each node of the excavated rachis, one sessile and perfect, the other with a pedicel and either staminate or empty. Scales of the perfect spikelet 4, the outermost thick and coriaceous, covering, together with the pedicel of the sterile spikelet, the excavation in the rachis; second scale chartaceous; third and fourth hyaline, the latter subtending a palet and perfect flower. Stamens 3. Styles distinct. Grain free. [Greek, in allusion to the tail-like spikes.]

About 25 species, widely distributed in tropical and temperate countries.

1. Manisuris rugòsa (Nutt.) Kuntze. Wrinkled Manisuris. (Fig. 215.)

Rottboellia rugosa Nutt. Gen. 1: 84. 1818.

Manisuris rugosa Kuntze, Rev. Gen. Pl. 780. 1891.

Manisuris rugosa Chapmani Scribn. Mem. Torr. Club, 5: 28. 1894.

Smooth and glabrous, culms erect, 2°–4° tall, compressed, much branched above, branches spreading. Sheaths compressed; leaves flat, acuminate, 6′–2° long, 1″–3″ wide; spikes partially included in the sheath or more or less exserted, 1½′–2½′ long; outermost scale of the spikelets oblong-ovate to ovate, about 2″ long, strongly transversely rugose, the wrinkles continuous or interrupted.

In wet soil along the coast, Delaware to Florida, west to Louisiana and Texas. June–Sept.

4. ANDROPÒGON L. Sp. Pl. 1045. 1753.

Perennial grasses with usually long narrow leaves, and terminal and axillary spikes, Spikelets in pairs at each node of the jointed hairy rachis, one sessile and perfect, the other with a pedicel and either staminate, empty or reduced to a single scale. Perfect spikelet consisting of 4 scales, the outermost coriaceous, the second keeled and acute, the two inner hyaline, the fourth more or less awned and subtending a palet and perfect flower. Stamens 1–3. Grain free. [Greek, in allusion to the bearded rachis.]

About 150 species, widely distributed in tropical and temperate regions. Besides the following, some 12 others occur in the southern and western parts of North America.

Internodes of the rachis clavate-thickened:
- Attenuate at base; spikes solitary, distant. 1. *A. scoparius.*
- Broad at base; spikes in pairs or digitate, occasionally panicled.
  - Hairs as long as the pedicel or longer.
    - Spikes in pairs; outer scales of sessile spikelet about 2½″ long. 2. *A. argyraeus.*
    - Spikes 2–5 together; outer scales of sessile spikelet about 4″ long. 3. *A. Hallii.*
  - Hairs less than one-half the length of the pedicel. 4. *A. furcatus.*

Internodes of the rachis not clavate-thickened, slender, more or less flexuous.
- Spikes protruding from the side of the inflated spathe, never on long-exserted peduncles.
  - Branches of the culm short, distant, forming a loose elongated inflorescence. 5. *A. Virginicus.*
  - Branches of the culm elongated, forming at summit a compact bushy inflorescence. 6. *A. glomeratus.*
- Spikes terminal on finally long-exserted peduncles; spathe narrow; upper sheaths elongated and much inflated, imbricated; upper nodes densely bearded. 7. *A. Elliottii.*

Internodes of the rachis much thickened on the margins, the intervening portion thin and translucent; nodes of the culm not bearded. 8. *A. Torreyanus.*

1. Andropogon scopàrius Michx. Broom Beard-grass. (Fig. 216.)

Andropogon scoparium Michx. Fl. Bor. Am. 1: 57. 1803.

Culms from a creeping rootstock, smooth, simple or much branched, 2°–4° tall. Sheaths smooth or scabrous, sometimes glaucous; leaves 6′–12′ long, 1″–3″ wide, acuminate, scabrous; spikes 1′–2′ long, loose, solitary, on long-exserted slender peduncles; rachis slender, flexuous, joints and pedicels ciliate with long spreading hairs; outermost scale of sessile spikelet about 3″ long, acuminate, scabrous; awn spiral, more or less bent at point of exsertion, 5″–6″ long, scabrous; pedicelled spikelet reduced to a single awn-pointed scale.

In dry sandy fields, New Brunswick to Alberta, south to Florida, Louisiana and Texas. Ascends to 3000 ft. in Georgia. Specimens determined as *A. maritimus* Chapm., from Cape May, N. J., appear to be referable to this species. Aug.–Oct.

2. Andropogon argyraèus Schultes. Silvery Beard-grass. (Fig. 217.)

Andropogon argenteus Ell. Bot. S. C. & Ga. 1: 148. 1817. Not DC. 1813.
Andropogon argyraeus Schultes, Mant. 2: 450. 1824.
Andropogon Belvisii Desv. Opusc. 67. 1831.

Culms erect, smooth, 2°–4° tall, simple at base, generally much branched above. Sheaths somewhat compressed, glabrous or pubescent; basal leaves 6′–1°; upper 2′–8′ by 1″ wide, acuminate, smooth to scabrous above, glabrous or pubescent beneath; spikes in pairs, 1′–2′ long, on more or less exserted slender peduncles; joints of the rachis and pedicels pubescent with long silky white spreading hairs; outermost scale of sessile spikelet about 2½″ long, acuminate, scabrous; awn loosely spiral, 6″–9″ long, scabrous; pedicelled spikelet reduced to a minute lanceolate acuminate scabrous scale, which is early deciduous.

In dry sandy soil, Delaware to Missouri, south to Florida and Texas. Culm leaves shorter and broader than the basal ones. Sept.

3. Andropogon Hàllii Hack. Hall's Beard-grass. (Fig. 218.)

Andropogon Hallii Hack. Sitz. Akad. Wiss. Wien, 89: 127. 1884.

Culms robust from a creeping rootstock, 3°–6° tall, simple at base, branched above, smooth, more or less glaucous. Sheaths somewhat glaucous; leaves 1° or less long, 3″–4″ wide, smooth; spikes 2–5 together, 2′–4′ long, the lateral ones often included in the spathes; joints of rachis and pedicels pubescent with spreading silky white or yellow hairs of about their own length; outermost scale of sessile spikelet about 4″ long, acuminate, glabrous at base, from sparingly to copiously silky-pubescent toward the apex; awn 2″–5″ long, or sometimes wanting; pedicelled spikelet consisting of 4 scales, the outermost generally larger than the corresponding scale of the sessile spikelet and subtending a palet and three stamens.

Dry sandy soil, Kansas and Montana to Mexico. Aug.–Sept.

4. Andropogon furcàtus Muhl. Forked Beard-grass. (Fig. 219.)

Andropogon furcatus Muhl.; Willd. Sp. Pl. 4: 919. 1806.
Andropogon provincialis subvar. *furcatus* Hack. in DC. Mon. Phan. 5: 442. 1889.

Culms erect, stout, smooth and glabrous, 3°–6° tall, simple at base, branched above. Sheaths smooth and glabrous; leaves smooth or rough, 6′–18′ long, 2″–7″ wide, acuminate; spikes 2–5, in pairs or approximate at the summit, 2′–5′ long; joints of rachis and pedicels ciliate with short hairs; outermost scale of sessile spikelet 3″–4″ long, twice the length of the rachis-joints, scabrous; awn 5″–7″ long, loosely spiral; pedicelled spikelet consisting of 4 scales.

In dry or moist soil, Maine and Ontario to Manitoba, south to Florida, Kansas and Texas. Aug.–Sept.

5. Andropogon Virgínicus L. Virginia Beard-grass. (Fig. 220.)

Andropogon Virginicus L. Sp. Pl. 1046. 1753.
Cinna lateralis Walt. Fl. Car. 59. 1788.
Andropogon dissitiflorus Michx. Fl. Bor. Am. 1: 57. 1803.
Andropogon vaginatus Ell. Bot. S. C. & Ga. 1: 148. 1817.

Culms erect, smooth, 2°–4° tall, simple at base, branching above. Sheaths smooth; leaves 6′–1° long, 1″–3″ wide, long-acuminate, scabrous on the margins; branches of culm short, forming a loose and elongated inflorescence; spikes in pairs, occasionally 3 or 4, about 1′ long, loose, protruding from the sides of the spathes; rachis flexuous, slender, the joints and pedicels pubescent with long spreading silky hairs; lowest scale of sessile spikelet about 1½″ long; awn 4″–9″ long, straight, scabrous; pedicelled spikelet generally wanting, occasionally a rudimentary scale present.

In dry or moist fields, Massachusetts to Pennsylvania and Illinois, south to Florida and Texas. Also in Cuba. Aug.–Sept.

6. Andropogon glomeràtus (Walt.) B. S. P. Bushy Beard-grass. (Fig. 221.)

Cinna glomerata Walt. Fl. Car. 59. 1788.
Andropogon macrourum Michx. Fl. Bor. Am. 1: 56. 1803.
Andropogon glomeratus B. S. P. Prel. Cat. N. Y. 67. 1888.

Culms erect, 1½°–3° tall, smooth, simple below, much branched above, upper nodes of branches barbed. Sheaths compressed, smooth to strongly scabrous, glabrous or pubescent; leaves 1″–2″ wide, scabrous, long-acuminate, the basal two-thirds as long as or equalling the culm, those of the culm 6′–18′ long; branches elongated, forming a compact terminal inflorescence; spikes in pairs, about 1′ long, loose, protruding from the sides of the scabrous spathes; rachis flexuous, the joints and pedicels pubescent with long spreading silky hairs; outermost scale of sessile spikelet about 1½″ long; awn 6″–9″ long, scabrous; pedicelled spikelet reduced to a single scale or wanting.

Damp soil, southern New York to central Pennsylvania and Florida, mostly near the coast. Sept.–Oct.

7. Andropogon Ellióttii Chapm. Elliott's Beard-grass. (Fig. 222.)

Andropogon Elliottii Chapm. Fl. S. States, 581. 1860.

Culms erect, 1°–3° tall, smooth, simple or sparingly branched above, branches strongly bearded at the upper nodes. Sheaths glabrous or loosely villous, the lower narrow, the upper elongated, inflated, imbricated; basal leaves about one-half as long as the culm, smooth, ½″–1½″ wide, those of the culm filiform or narrowly linear, 2′–10′ long, ½″–1″ wide; in pairs, 1′–2′ long, loose, finally long-exserted on filiform peduncles; rachis slender, flexuous, its joints and the pedicels pubescent with long spreading silky hairs; outermost scale of the sessile spikelet 1½″–2″ long, scabrous on the keel; awn 6″–9″ long, scabrous; pedicelled spikelet a minute scale or wanting.

In dry or moist places, Pennsylvania to Florida and Texas. Aug.–Sept.

8. Andropogon Torreyànus Steud. Torrey's Beard-grass. (Fig. 223.)

Andropogon glaucus Torr. Ann. Lyc. N. Y. 1: 153. 1824. Not Muhl. 1817.

Andropogon Torreyanus Steud. Nomencl. Ed. 2, 93. 1841.

Andropogon Jamesii Torr. Marcy's Rep. 302. 1853.

Andropogon saccharoides var. *Torreyanus* Hack. in DC. Monog. Phan. 6: 495. 1889.

Culms erect, 1½°–3½° tall, simple or branched, glabrous, the nodes naked. Sheaths smooth and glabrous, more or less glaucous; leaves 3′–7′ long, 2″–3″ wide, long-acuminate, smooth and glabrous towards the base, scabrous on margins and at the apex, glaucous; spikes 1′–1½′ long in a terminal long-exserted panicle 2′–4′ long; joints of the rachis with a thin translucent median line; outermost scale of sessile spikelet 1½″–2″ long, about equalling the terminal hairs of the rachis-joints, lanceolate, acute, pubescent at base with long silky hairs; awn 4″–8″ long, spiral, bent, scabrous; pedicelled spikelet reduced to a single narrow scale.

In dry soil, Kansas to Arizona and Mexico. Aug.–Sept.

5. CHRYSOPÒGON Trin. Fund. Agrost. 187. 1820.

Generally tall grasses, ours perennials, with long narrow flat leaves and terminal panicles. Spikelets in pairs or 3's, one sessile and perfect, the lateral pedicelled, staminate, empty, or reduced to the pedicel only. Perfect spikelet consisting of 4 scales, the two outer indurated and shining, the inner hyaline, the fourth awned and subtending a palet and perfect flower, or the palet sometimes wanting. Stamens 3. Styles distinct; stigmas plumose. Grain free. [Greek, referring to the golden-yellow hairs on the spikelets.]

About 20 species, in temperate and tropical countries.

1. Chrysopogon avenàceus (Michx.) Benth. Indian Grass. (Fig. 224.)

Andropogon avenaceum Michx. Fl. Bor. Am. 1: 58. 1803.

Sorghum nutans A. Gray, Man. 617. 1848.

Sorghum avenaceum Chapm. Fl. S. States, 583. 1860.

Chrysopogon avenaceus Benth. Journ. Linn. Soc. 19: 73. 1881.

Culms erect, 3°–8° tall, from creeping rootstocks, smooth, the nodes pubescent. Sheaths smooth; lower leaves 1° or more in length, 2″–8″ wide, long-acuminate, scabrous; paniele 4′–12′ long; branches 2′–4′ long, slender, erect-spreading; spikelets in pairs, or in 3's at the ends of the branches, erect or somewhat spreading; first scale of sessile spikelet 3″–4″ long, acute, pubescent with long hairs; second scale glabrous; awn 5″–10″ long, the column very little if at all bent; lateral spikelets reduced to plumose pedicels.

In dry fields, Ontario to Manitoba, south to Rhode Island, Florida and Arizona. Panicle brownish-yellow. Aug.–Sept.

Chrysopogon nutans (L.) Benth., distinguished from this species by its longer awn (12″–15″ long), supported on a column distinctly bent at about the middle, occurs in Tennessee and is said to have been recently found in Kentucky.

6. SÓRGHUM Pers. Syn. 1: 101. 1805.

Annual or perennial grasses with long broad flat leaves and terminal ample panicles. Spikelets in pairs at the nodes, or in 3's at the ends of the branches, one sessile and perfect, the lateral pedicelled, staminate or empty. Sessile spikelet consisting of 4 scales, the outer indurated and shining, obscurely nerved, inner hyaline, the fourth awned and subtending a small palet and perfect flower, or palet sometimes wanting. Stamens 3. Styles distinct. Grain free. [Name Indian.]

About 13 species, of wide distribution in tropical and warm-temperate regions.

1. Sorghum Halepénse (L.) Pers. Johnson-grass. (Fig. 225.)

Holcus Halepensis L. Sp. Pl. 1047. 1753.

Andropogon Halepensis Brot. Fl. Lusit. 1: 89. 1804.

Sorghum Halepense Pers. Syn. 1: 101. 1805.

Culms erect, 3°–5° tall, simple or sometimes much branched, smooth and glabrous. Sheaths smooth; leaves 1° or more long, ¼′–1′ wide, long-acuminate; paniele open, from ½°–1½° long, the generally whorled branches spreading and naked towards the base; outer scales of sessile spikelet 2″–3″ long, ovate-lanceolate, usually purplish, pubescent with long appressed hairs; awn when present 4″–8″ long, more or less bent; pedicelled spikelets of 4 scales, the outer two about 3″ long, membranous, 7–9-nerved, their inrolled margins ciliate, the inner two shorter and narrower, hyaline, sometimes with staminate flowers.

In fields and waste places, southern Pennsylvania to Missouri, south to Florida and Texas. Widely distributed by cultivation in tropical America. Native of southern Europe and Asia. July–Sept.

7. NÀZIA Adans. Fam. Pl. 2: 31. 1763.

[TRAGUS Hall. Hist. Stirp. Helv. 2: 203. 1768.]

[LAPPAGO Schreb. Gen. 55. 1789.]

An annual grass, diffusely branched, with flat leaves and 1-flowered deciduous spikelets, either solitary or in clusters of 3–5 in a terminal spike. Scales of spikelet 2 or 3, the outermost small or wanting, the second rigid and covered with hooked prickles, the third membranous, subtending a palet and perfect flower. [Name unexplained.]

A monotypic genus, native of tropical and temperate regions of the Old World.

1. Nazia racemòsa (L.) Kuntze. Prickle-grass. (Fig. 226.)

Cenchrus racemosa L. Sp. Pl. 1049. 1753.
Lappago racemosa Willd. Sp. Pl. 1: 484. 1798.
Nazia racemosa Kuntze, Rev. Gen. Pl. 780. 1891.

Culms 2′–14′ tall, erect, simple to diffusely branched, smooth below, pubescent above. Sheaths smooth and glabrous; leaves 1′–3′ long, 1″–2″ wide, acuminate, rather strongly ciliate; spike 1′–4′ long, sometimes partially included in the somewhat inflated upper sheath; spikelets 1-flowered: first scale very small, almost hyaline; second scale coriaceous, 1½″ long, acute, 5-nerved, each nerve armed with a row of hooked prickles; third scale 1″ long, keeled, sharp-pointed, 1-nerved, membranous, enclosing a palet of like texture and a perfect flower.

Occasional in ballast and waste places about the Atlantic seaports. Abundant from Texas to Arizona and Mexico. Native of Europe and Asia. July–Sept.

8. PÁSPALUM L. Syst. Ed. 10, 2: 855. 1759.

Perennial grasses of various habit, with generally flat leaves and 1-flowered spikelets borne in 2–4 rows on 1-sided spikes, which are single, in pairs, or panicled. Spikelets oblong to orbicular, flat on the inner surface, convex on the outer. Scales 3, rarely 2 by the absence of the outermost, the outer ones membranous, the inner one indurated and subtending a palet and perfect flower. Stamens 3. Styles separate; stigmas plumose. Grain ovoid or oblong, free. [An ancient Greek name for some grass, used by Hippocrates.]

About 160 species, of wide distribution in tropical and temperate regions, most abundant in America.

Spikelets secund, with the back of the flowering scale turned toward the rachis.
  Rachis membranous, dilated, its wings almost enclosing the spikelets at maturity.
    Extending beyond the spikelets, long-acuminate; spikelets about ½″ long. 1. *P. mucronatum.*
    Not extending beyond the spikelets, acute; spikelets about 1″ long. 2. *P. membranaceum.*
  Rachis not membranous nor enclosing the spikelets at maturity.
    Spikelets oval or elliptic, acute.
      Spikelets glabrous or somewhat pubescent; spikes in pairs or occasionally in 3's. 3. *P. distichum.*
      Spikelets villous on margins; spikes 4–12. 4. *P. dilatatum.*
    Spikelets from oval to orbicular, very obtuse.
      Spikes 1, or sometimes 2, on the 1–3 slender peduncles exserted from the upper sheath; spikelets 1″ or less long.
        Leaves and sheaths pubescent, the former generally long, narrow and erect; spikelets about ¾″ long. 5. *P. setaceum.*
        Leaves and sheaths glabrous or somewhat pubescent, the former long and broad, lax, ciliate; spikelets about 1″ long. 6. *P. ciliatifolium.*
        Leaves and sheaths glabrous, the former short and broad, ciliate on the margins; spikelets about ¾″ long. 7. *P. longipedunculatum.*
      Spikes 2 or more on the single stout peduncle.
        Spikelets 1¼″–1½″ long; spikes generally spreading. 8. *P. laeve.*
        Spikelets exceeding 1½″ in length; spikes generally erect. 9. *P. Floridanum.*
Spikelets not strictly secund, the back of the flowering scale turned away from the rachis.
  Spikelets less than 1″ long, oblong. 10. *P. compressum.*
  Spikelets about 2″ long, broadly lanceolate. 11. *P. paspaloides.*

1. Paspalum mucronàtum Muhl. Water Paspalum. (Fig. 227.)

Paspalum mucronatum Muhl. Cat. 8. 1813.
Ceresia fluitans Ell. Bot. S. C. & Ga. 1: 109. 1817.
Paspalum fluitans Kunth, Rev. Gram. 1: 24. 1829.

Culms ascending, 6′–3° long, from a floating or creeping base, branched. Sheaths very loose or inflated, smooth or scabrous, glabrous or pubescent; leaves 3′–12′ long, ¼′–1′ wide, acuminate, scabrous; spikes 20–100, ½′–3′ long, alternate or whorled, slender; rachis flat, thin, exceeding the spikelets, long-acuminate, scabrous, its margins nearly enclosing the spikelets; spikelets in two rows, about ½″ long, elliptic, pubescent; outer scales very thin, 2-nerved, the first one usually a little the longer.

In water, Virginia to southern Illinois and Missouri, south to Florida and Texas. Also in tropical America. Sept.

2. Paspalum membranàceum Walt. Walter's Paspalum. (Fig. 228.)

Paspalum membranaceum Walt. Fl. Car. 75. 1788. Not Lam. 1791.
Paspalum Walterianum Schultes, Mant. 2: 166. 1824.

Culms erect or ascending, much branched, smooth, creeping at the base. Sheaths a little inflated, smooth; leaves 1½′–3½′ long, 2″–3″ wide, flat, smooth, acute; spikes 3–7, alternate, about 1′ long, the lower ones usually included in the upper sheath; rachis not exceeding the spikelets, flat, thin, 1″–1½″ wide, acute, smooth, many-nerved, its incurved margins partly enclosing the spikelets; spikelets about 1″ long, crowded in 2 rows, oval, obtuse, smooth; outer scales 5-nerved; third scale lenticular, slightly shorter than the outer ones.

Moist or wet grounds, New Jersey and Delaware to southern Ohio, south to Florida and Texas. Sept.

3. Paspalum dístichum L. Joint-grass. (Fig. 229.)

Paspalum distichum L. Amoen. Acad. 5: 391. 1759.

Culms erect, 6′–2° tall, extensively creeping at base. Sheaths smooth, sometimes ciliate on the margins, or sparsely pubescent; leaves flat, 1½′–5′ long, 1″–2″ wide, acuminate, smooth; spikes 1′–2½′ long, in pairs, or occasionally with a third, exserted; rachis flat, ½″–1″ wide, smooth; spikelets 1¼″–1½″ long, elliptic, somewhat pubescent or glabrous, acute, nearly sessile in 2 rows; outer scales 3–5-nerved, slightly exceeding the acute third one which is sparingly bearded at the apex.

Virginia to Missouri and California, south to Florida, Texas and Mexico. Also in the West Indies, central and South America. Aug.–Sept.

4. Paspalum dilatàtum Poir. Tall Paspalum. (Fig. 230.)

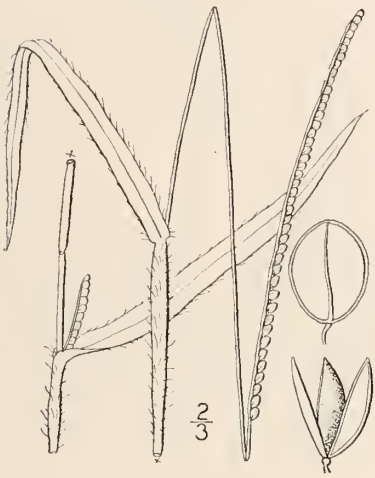
Paspalum dilatatum Poir. in Lam. Encycl. 5: 35. 1804.

Paspalum ovatum Nees, Agrost. Bras. 43. 1829.

Culms erect, 3°–6° tall, smooth and glabrous. Sheaths compressed, smooth and glabrous; leaves 1° or more long, 2″–5″ wide, long-acuminate, rather scabrous on the margins, sometimes with a tuft of hairs at the base; spikes 4–12, 2′–5′ long, spreading, alternate, ¾′–2′ distant on the main axis; rachis of the spikes narrow, less than 1″ wide, somewhat flexuous, scabrous; spikelets about 1½″ long, in 3 or 4 rows, acute; outer scales 5-nerved, the first villous on the margins, the second glabrous or sparsely pubescent, the third nearly orbicular, minutely punctate-striate.

In moist soil, Virginia to Florida, west to Texas. Ascends to 1000 ft. in Georgia. Aug.–Sept.

5. Paspalum setàceum Michx. Slender Paspalum. (Fig. 231.)



Paspalum setaceum Michx. Fl. Bor. Am. 1: 43. 1803.

Paspalum pubescens Muhl. Gram. 92. 1817.

Culms mostly erect, 1°–2° tall, slender, smooth. Sheaths and leaves generally very pubescent, the latter 3′–8′ long, 1″–3″ wide, erect, acuminate; spikes 1½′–3½′ long, more or less curved, generally solitary, occasionally 2, on a long-exserted slender peduncle, with usually 1 or 2 additional shorter peduncles from the same upper sheath; spikelets about ¾″ long, in 2 narrow rows, broadly obovate, very obtuse; empty scales 3-nerved, glabrous or pubescent; third scale obovate, shining.

In dry fields, Massachusetts to Illinois, south to Florida and Texas. Ascends to 2200 ft. in Virginia. Aug.–Sept.

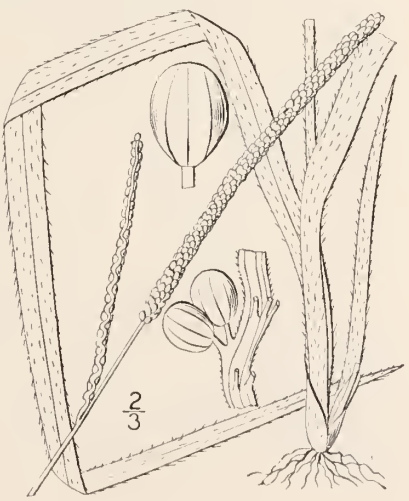
6. Paspalum ciliatifòlium Michx. Ciliate-leaved Paspalum. (Fig. 232.)

Paspalum ciliatifolium Michx. Fl. Bor. Am. 1: 44. 1803.

Paspalum dasyphyllum Ell. Bot. S. C. & Ga. 1: 105. 1817.

Culms erect, 1½°–2½° tall, smooth. Sheaths varying from glabrous to pubescent; leaves 4′–9′ long, 3″–7″ wide acuminate, pubescent or glabrous, ciliate, the upper one usually broad and cordate at base; spikes 1 or 2, occasionally 3, 2′–4′ long; peduncles 1–3, exserted from the upper sheath; rachis very narrow, slightly flexuous and triangular, scabrous; spikelets 1″–1¼″ long, in 2–4 rows, crowded, oval, the first or convex scale sometimes sparingly pubescent, the third scale with a distinct depression on the back near the base.

In dry soil, New Jersey and Pennsylvania to Kansas, south to Florida and Texas. June–Aug.



7. Paspalum longipedunculàtum Le Conte. Long-stalked Paspalum. (Fig. 233.)

Paspalum debile Michx. Fl. Bor. Am. 1: 44. 1803?
Paspalum longipedunculatum LeConte, Journ. Phys. 91: 284. 1820.
Paspalum arenarium Schrad.; Schultes, Mant. 2: 172. 1824?

Culms reclining or decumbent, 1°–1½° long, smooth, leafy at base. Sheaths glabrous or ciliate on the margins, pilose at the throat; leaves 1′–3½′ long, 2″–3″ wide, glabrous or a little pilose, acuminate, ciliate on the margins and along the mid-nerve; peduncles 1–2 from the upper sheath; spikes 1–2, 1′–2½′ long, more or less curved; rachis very narrow, more or less flexuous; spikelets about ¾″ long, nearly globular; outer scales 3-nerved, the first one glabrous or sometimes sparsely pubescent; third scale slightly exceeding the outer ones.

Sandy soil, North Carolina to Florida, Kentucky and Tennessee. Aug.–Sept.

8. Paspalum laève Michx. Field Paspalum. (Fig. 234.)

Paspalum laeve Michx. Fl. Bor. Am. 1: 44. 1803.

Bright green, culms rather stout, erect or ascending, 1°–3° tall, glabrous. Sheaths compressed, glabrous or pubescent; leaves 3′–12′ long, 2″–4″ wide, acuminate, glabrous or pubescent, scabrous on the margins; spikes 2–6, 1½′–3′ long, more or less spreading, alternate, about 1′ apart on the single stout peduncle, pilose in the axils; spikelets 1¼″–1½″ long, oval to orbicular, close, crowded in 2 rows, glabrous.

In moist fields, Rhode Island to Kentucky and Missouri, south to Florida and Texas. Ascends to 1700 ft. in North Carolina. Aug.–Sept.

9. Paspalum Floridànum Michx. Florida Paspalum. (Fig. 235.)

Paspalus Floridanus Michx. Fl. Bor. Am. 1: 44. 1803.

Paspalum macrospermum Flugge, Monog. 172. 1810.

Culms stout, erect, 3°–6° tall, from a creeping rootstock, glabrous. Sheaths glabrous, or the lower pubescent, sometimes glaucous; leaves 8′–15′ long, 3″–7″ wide, acuminate, glabrous or pubescent; spikes 2–5 on the single stout peduncle, 2′–5′ long, erect or ascending, bearded in the axils; rachis about 1″ wide, flat on the back, scabrous on the margins; spikelets 1½″–2″ long, broadly oval, glabrous, sometimes glaucous, crowded in 2 rows; outer scales 5-nerved; third scale striate.

Moist places, Delaware to Kentucky, south to Florida and Texas. Sept.

10. Paspalum compréssum (Sw.) Nees. Flat Paspalum. (Fig. 236.)

Paspalum tristachyum Lam. Tabl. Encycl. 1: 176. 1791?
Milium compressum Sw. Fl. Ind. Occ. 1: 183. 1797.
Paspalum platycaulon Poir. in Lam. Encycl. 5: 34. 1804.
Paspalum compressum Nees, in Mart. Fl. Bras. 2: 23. 1829.

Stolons numerous, leafy, sometimes 2° long. Culms 6′–2° tall, slender, compressed, glabrous; sheaths loose; leaves glabrous, sometimes sparsely ciliate, obtuse, those of the culm 2′–4′ long, 2″–3″ wide, those of the stolons about 1′ long, 1″–2″ wide; spikes 2–5, 1′–2′ long, approximate at the summit of the long and slender stalk; spikelets not crowded nor secund, about 1″ long, acute, the back of the flowering scale turned oblong, away from the rachis.

Virginia to Florida and west to Louisiana. Widely distributed in tropical America. Probably not native in the United States. Aug.–Sept.

11. Paspalum paspaloìdes (Michx.) Scribner. Crab-grass Paspalum. (Fig. 237.)

Digitaria paspaloides Michx. Fl. Bor. Am. 1: 46. 1803.
Paspalum Michauxianum Kunth, Rev. Gram. 1: 25. 1835.
Paspalum Elliottii S. Wats. in A. Gray, Man. Ed. 6, 629. 1890.
Paspalum paspaloides Scribn. Mem. Torr. Club, 5: 29. 1894.

Culms 1°–2½° tall, erect, from an extensively creeping base, slender, glabrous. Sheaths and leaves glabrous or pubescent, the latter 2′–9′ long, 3″–6″ wide, obtuse; spikes 1½′–3½′ long, in pairs, or sometimes with an additional one, near the summit of the 1–2 slender stalks, which are long-exserted from the upper sheath; rachis flat, about ½″ wide, scabrous on the margins, the internodes about equalling the spikelets in length; spikelets about 2″ long, broadly lanceolate, acute, not crowded; outer scales 5-nerved, glabrous, the back of the third scale turned away from the rachis.

Moist ground, Maryland to Florida, west to Texas. July–Aug.

9. AMPHICÀRPON Raf. Am. Month. Mag. 2: 175. 1818.

Erect perennial grasses, with flat leaves and spikelets of two kinds; one kind borne in terminal panicles, deciduous without perfecting fruit; the other solitary, terminating subterranean peduncles, and maturing seed. Scales 3, membranous, the innermost subtending a palet and a perfect flower; the scales of the subterranean spikelets become indurated and enclose the grain. Stamens 3. Stigmas plumose. [Greek, in allusion to the two kinds of spikelets.]

Species 2, inhabiting the southeastern United States, one of them restricted to Florida.

1. **Amphicarpon Amphicàrpon** (Pursh) Nash. Amphicarpon. (Fig. 238.)

Milium amphicarpon Pursh, Fl. Am. Sept. 1: 62. *pl. 2.* 1814.
Milium ciliatum Muhl. Gram. 77. 1817.
Amphicarpum Purshii Kunth, Rev. Gram. 28. 1829–35.
Amphicarpon Amphicarpon Nash, Mem. Torr. Club, 5: 352. 1894.

Culms erect, 12′–18′ tall, slender, glabrous. Sheaths papillose-hirsute; ligule pilose; leaves 1′–6′ long, 2″–6″ wide, erect, acuminate, hirsute and ciliate; panicle linear, 4′–6′ long, branches 3–4, erect, bearing few spikelets; spikelets about 2″ long, elliptic; outer scales 5-nerved, membranous, glabrous; subterranean spikelets ovoid in fruit, about 3″ long, acute, the scales all becoming much indurated.

In moist pine barrens, New Jersey to Florida near the coast. Aug.–Sept.

10. ERIÓCHLOA H.B.K. Nov. Gen. 1: 94. 1815.

[HELOPUS Trin. Fund. Agrost. 103. 1820.]

Perennial grasses with flat leaves, and short-pedicelled spikelets borne in secund spikes, which form a terminal panicle. Spikelets with an annular callus at the base and articulated to the pedicel. Scales 3, the two outer membranous, acute, the inner one shorter, indurated and subtending a palet and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. Grain free. [Greek, signifying wool-grass.]

Species about 5, in tropical and temperate countries.

1. **Eriochloa punctàta** (L.) W. Hamilt. Dotted Millet. (Fig. 239.)

Milium punctatum L. Amoen. Acad. 5: 392. 1759.
Eriochloa polystachya H.B.K. Nov. Gen. 1: 95. *pl. 31.* 1815.
Eriochloa punctata W. Hamilt. Prodr. Pl. Ind. Occ. 5. 1825.

Culms erect or ascending, 1°–3° tall, glabrous. Sheaths glabrous or sometimes pubescent; ligule a fringe of short white hairs; leaves 2′–10′ long, 2″–3″ wide, acuminate, glabrous or pubescent; spikes 4–25, 1′–2′ long, sessile or nearly so; rachis pubescent; spikelets about 2″ long, ovate-lanceolate, acuminate; outer scales pubescent with appressed silky hairs, the first a little exceeding the second, the third about 1″ long, rounded at the apex and bearing a pubescent awn about ½″ long.

Kansas to Texas and Mexico. Widely distributed in tropical America.

11. SYNTHERÍSMA Walt. Fl. Car. 76. 1788.

[DIGITARIA Scop. Fl. Carn. Ed. 2, 1: 52. 1772. Not Heist. 1763.]

Annual grasses with flat leaves, and spikelets borne in pairs or sometimes in 3's, in secund spikes which are digitate or approximate at the summit of the culm. Spikes often purplish. Scales of the spikelet 4, sometimes 3 by the suppression of the lowest one; the fourth or innermost scale chartaceous, subtending a palet of similar texture and a perfect flower. Stamens 3. Stigmas plumose. [Greek, crop-making, in allusion to its abundance.]

About 20 species, widely distributed in temperate and tropical regions.

Rachis flat, broadly winged; spikes narrowly linear.
Spikelets 1¼″–1½″ long; second scale about one-half as long; first minute, rarely wanting. 1. *S. sanguinalis.*
Spikelets about 1″ long; second scale about as long; first scale wanting, rarely present. 2. *S. linearis.*
Rachis 3-angled, not winged; spikes filiform. 3. *S. filiformis.*

1. Syntherisma sanguinàlis (L.) Nash. Large Crab-grass Finger-grass. (Fig. 240.)

Panicum sanguinale L. Sp. Pl. 57. 1753.
Digitaria sanguinalis Scop. Fl. Carn. Ed. 2, 1: 52. 1772.
Syntherisma praecox Walt. Fl. Car. 76. 1788.
Paspalum sanguinale Lam. Tabl. Encycl. 1: 176. 1791.
Syntherisma sanguinalis Nash, Bull. Torr. Club, 22: 420. 1895.

Culms erect or decumbent, often rooting at the lower nodes, 1°–3° long, smooth. Sheaths glabrous or pubescent; leaves 2′–6′ long, 2″–4″ wide, acuminate, glabrous or more or less pubescent; spikes 3–10, narrowly linear, 2′–6′ long, digitate or in approximate whorls at the summit of the culm; rachis flat, winged; spikelets 1¼″–1½″ long, in pairs, one sessile or nearly so, acute, lanceolate; first scale minute, rarely wanting, second one-third to one-half as long as the spikelet.

In cultivated or waste places, throughout North America, except the extreme north. Naturalized from Europe. Widely distributed as a weed in all cultivated regions. July–Aug.

2. Syntherisma lineàris (Krock.) Nash. Small Crab-grass. (Fig. 241.)

Panicum lineare Krock. Fl. Sil. 1: 95. 1787.
Syntherisma serotina Walt. Fl. Car. 76. 1788.
Digitaria humifusa Pers. Syn. 1: 85. 1805.
Syntherisma glabra Schrad. Fl. Germ. 1: 163. 1806.
Paspalum ambiguum DC. Fl. Gall. 123. 1806.
Panicum glabrum Gaud. Agrost. 1: 22. 1811.
Syntherisma linearis Nash, Bull. Torr. Club, 22: 420. 1895.

Culms erect or decumbent, ½°–2° long, smooth and glabrous. Sheaths and leaves glabrous, the latter 1′–3′ long, 1″–2″ wide, acuminate; spikes 2–4, 2′–4′ long, narrowly linear, digitate or approximate at the summit of the culm; rachis flat, winged; spikelets about 1″ long, in pairs, sometimes in 3's, one of them sessile or nearly so, elliptic, acute; first scale rarely present, second and third as long as the fourth.

In cultivated grounds and waste places, Nova Scotia to Ontario and Minnesota, south to Florida and Louisiana. Naturalized from Europe. July–Sept.

3. Syntherisma filifórmis (L.) Nash. Slender Finger-grass. (Fig. 242.)

Panicum filiforme L. Sp. Pl. 57. 1753.
Paspalum filiforme Sw. Prodr. 22. 1788.
Syntherisma villosa Walt. Fl. Car. 77. 1788.
Digitaria filiformis Muhl. Gram. 131. 1817.
Syntherisma filiformis Nash, Bull. Torr. Club, 22: 420. 1895.

Culms erect, 1°–4° tall, slender, smooth. Sheaths hirsute; leaves 1′–8′ long, ½″–2″ wide, erect, smooth or scabrous; spikes 2–5, filiform, 1′–5′ long, approximate at the summit of the culm, erect or nearly so; rachis 3-angled, very slender, not winged; spikelets ¾″–1″ long, elliptic, pubescent, in pairs, occasionally in 3's, one sessile or short-pedicelled; first scale rarely present; second three-fourths as long as or equalling the third, which is equal in length to the fourth.

Dry sandy soil, Massachusetts to Michigan, south to Florida, Nebraska and Texas. July–Sept.

12. PÁNICUM L. Sp. Pl. 55. 1753.

Annuals or perennials of various habit, foliage and inflorescence. Spikelets 1–2-flowered, when 2-flowered the lower one staminate only. Scales 4, the 3 lower membranous, empty, or the third with a staminate flower, varying in the same species; the inner or fourth scale chartaceous, shining, enclosing a palet of similar texture and a perfect flower. Awns none, except in Nos. 1 and 2. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the hardened fruiting scale and palet. [Old Latin name for some grass, probably the cultivated Sorghum, referring to its panicle, taken from Pliny.]

About 300 species, in temperate and tropical regions. The geographic distribution of many of our species is not well ascertained. The old English name *Panic* or *Panic-grass*, is often applied to any of the species.

Panicle oblong to ovoid; spike-like branches sessile, more or less spreading; spikelets in 2–4 rows, secund; third scale, and sometimes the second and first, awn-pointed or awned.
- Sheaths smooth; culms 2°–4° tall; fourth scale ovate, abruptly pointed. 1. *P. Crus-galli.*
- Sheaths, at least the lower ones, hirsute; culms 4°–6° tall; fourth scale ovate-lanceolate, acuminate. 2. *P. Walteri.*

Panicle linear, spicate at summit; branches appressed, sessile; third scale merely acute or acuminate.
- Spikelets ovate, acute, about 1¼″ long. 3. *P. digitarioides.*
- Spikelets oval or obovoid, obtuse, turgid, about 1½″ long. 4. *P. obtusum.*

Panicle ovoid or oblong; primary branches spreading or ascending, secondary generally appressed, occasionally divaricate, bearing numerous pointed spikelets not exceeding 1½″ in length.
- Palet in the axil of the third scale conspicuous, enlarged, much exceeding the fourth scale; spikelets open. 5. *P. hians.*
- Palet in the axil of the third scale inconspicuous; spikelets closed.
  - Spikelets 1½″ long, curved. 6. *P. rostratum.*
  - Spikelets less than 1½″ long, straight or but slightly curved.
    - Culms stout; lateral panicles numerous; ligule short, naked or sparsely short-ciliate.
      - Spikelets about ¾″ long, acute; secondary branches of mature panicle generally appressed. 7. *P. agrostidiforme.*
      - Spikelets about 1¼″ long, acuminate; secondary branches of the mature panicle generally spreading or divaricate. 8. *P. elongatum.*
    - Culms slender, simple, or occasionally with a single lateral panicle; spikelets about 1″ long, acuminate; ligule short, pilose. 9. *P. longifolium.*

Branches of the panicle single, in pairs or fascicled, simple or subdivided, naked below; spikelets on slender pedicels.
- Basal leaves, or those near the base, much shorter and broader than the upper culm leaves; spikelets turgid, obtuse or acutish; panicle not over 6′ in length, generally much smaller.
  - Culm leaves broad, cordate and clasping at base.
    - Spikelets less than 1″ long.
      - Leaves erect or ascending, 2′–4′ long; sheaths generally shorter than the internodes. 10. *P. sphaerocarpon.*
      - Leaves widely spreading, 5′–8′ long; sheaths longer than the internodes. 11. *P. microcarpon.*
    - Spikelets 1″ or more long.
      - Sheaths smooth, glabrous or softly pubescent.
        - Nodes strongly barbed; sheaths and leaves generally softly pubescent; spikelets elliptic, 2″–2½″ long. 12. *P. Porterianum.*
        - Nodes, at least the upper ones, naked; sheaths glabrous.
          - Spikelets about 1″ long, elliptic. 13. *P. commutatum.*
          - Spikelets 1½″–2″ long, oval to obovoid; leaves generally ciliate. 14. *P. macrocarpon.*
      - Sheaths papillose-hispid; spikelets about 1¼″ long; panicle generally much included, sometimes long-exserted. 15. *P. clandestinum.*
  - Culm leaves lanceolate, rounded, truncate or subcordate at base, sometimes narrowed.
    - Spikelets 1½″–2″ long.
      - Panicle linear, loose; branches appressed. 16. *P. xanthophysum.*
      - Panicle ovoid to oblong, compact; branches more or less spreading.
        - Leaves spreading, 3″–6″ wide; spikelets obovoid. 17. *P. Scribnerianum.*
        - Leaves erect, less than 2″ wide, long-acuminate; spikelets elliptic. 18. *P. Wilcoxianum.*
    - Spikelets less than 1½″ long.
      - Culm leaves 1–4, erect; culms mostly simple, never profusely branched late in the season.
        - Sheaths and leaves glabrous. 19. *P. boreale.*
        - Sheaths and leaves pubescent. 20. *P. laxiflorum.*
      - Culm leaves generally numerous, usually spreading; culms simple early in the season, later profusely branched.
        - Spikelets about ½″ long. 21. *P. nitidum.*
        - Spikelets about 1″ long.
          - Sheaths glabrous.
            - Nodes naked, or the lower sometimes sparingly barbed; spikelets about 1″ long. 22. *P. dichotomum.*
            - Nodes barbed; spikelets about ¾″ long. 23. *P. barbulatum.*
          - Sheaths pubescent.
            - Primary panicle 3′–6′ long; spikelets fully 1″ long, primary culm leaves 4′–7′ long. 24. *P. viscidum.*
            - Primary panicle 3′ or less long; spikelets hardly 1″ long; primary culm leaves less than 4′ long. 25. *P. pubescens.*
  - Culm leaves long and very narrow, sometimes involute.
    - Leaves elongated, crowded at base, half as long as or equalling the culm; secondary panicles borne on short basal branches. 26. *P. depauperatum.*
    - Leaves long and narrow, distributed along the culms, which are profusely branched above late in the season. 27. *P. angustifolium.*

Basal leaves and those of the culm the same, generally elongated; spikelets acute or acuminate.
Spikelets 2″ long or more.
Sheaths glabrous.
Panicle usually 1° long or more; branches spreading; leaves 1° long or more, flat. 28. *P. virgatum.*
Panicle 1° long or less; branches erect or appressed; leaves 6′–1° long, involute on the margins, at least at the apex, thick, glaucous. 29. *P. amarum.*
Sheaths papillose-pubescent. 30. *P. miliaceum.*
Spikelets 1½″ long or less.
Culms stout, finally decumbent and much branched, with lateral panicles from all the upper sheaths.
Sheaths glabrous. 31. *P. proliferum.*
Sheaths pubescent. 32. *P. capillare.*
Culms slender, erect or decumbent, branched only at base.
Spikelets 1″–1½″ long, generally single on the ultimate divisions of the panicle.
Panicle narrow; branches erect, the lower ones about 3′ long; axils naked. 33. *P. flexile.*
Panicle at length diffuse; branches 4′–8′ long; axils bearded. 34. *P. autumnale.*
Spikelets less than 1″ long, in pairs.
Spikelets smooth, elliptic, acute. 35. *P. minus.*
Spikelets warty, obovoid, acutish. 36. *P. verrucosum.*
Panicle linear; branches appressed; second scale of spikelet obtuse, gibbous at base. 37. *P. gibbum.*

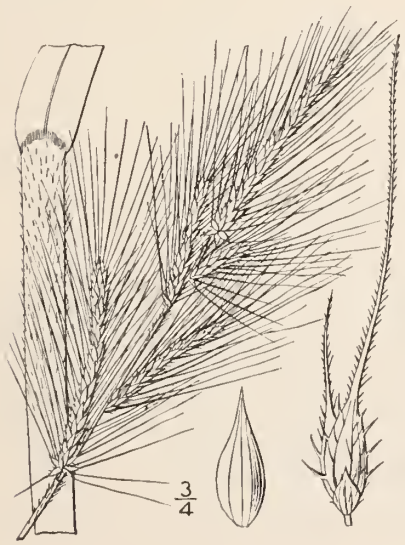
1. Panicum Crús-gálli L. Barnyard Grass. Cockspur Grass. (Fig. 243.)

Panicum Crus-galli L. Sp. Pl. 56. 1753.

Culms 2°–4° tall, often branching at base. Sheaths smooth and glabrous; leaves 6′–2° long, ¼′–1′ wide, glabrous, smooth or scabrous; panicle composed of 5–15 sessile erect or ascending branches, or the lower branches spreading or reflexed; spikelets ovate, green or purple, densely crowded in 2–4 rows on one side of the rachis; second and third scales about 1½″ long, scabrous or hispid, the third scale more or less awned, empty, the fourth ovate, abruptly pointed.

In cultivated and waste places, throughout North America except the extreme north. Widely distributed as a weed in all cultivated regions. Naturalized from Europe. Aug.–Oct.

Panicum colonum L., a southern species, related to this, but with awnless scales, has been found in southeastern Virginia, too late for illustration here. (See Appendix.)



2. Panicum Wàlteri Pursh. Salt-marsh Cockspur Grass. (Fig. 244.)

Panicum hirtellum Walt. Fl. Car. 72. 1788. Not All. 1785.
Panicum Walteri Pursh, Fl. Am. Sept. 1: 66. 1814.
Panicum hispidum Muhl. Gram. 107. 1817.
Panicum Crus-galli var. *hispidum* Torr. Fl. N. Y. 2: 424. 1843.

Culms 3°–6° tall, robust, smooth. Sheaths, at least the lower ones, papillose-hispid; leaves 1° or more long, ½′–1′ wide, generally smooth beneath, strongly scabrous above; panicle 6′–18′ long, consisting of 10–40 ascending or spreading branches; spikelets ovate-lanceolate, densely crowded in 2–4 rows on one side of the scabrous and hispid rachis, brownish purple; second and third scales about 1½″ long, scabrous and hispid, tipped with upwardly barbed awns, sometimes 10–20 times their length; fourth scale ovate-lanceolate, acuminate.

In marshes and ditches, principally within the influence of salt water, Ontario to Rhode Island, Florida and Louisiana. Aug.–Oct.

3. Panicum digitarioides Carpenter. Narrow Panicum. (Fig. 245.)

Panicum carinatum Torr. Bost. Journ. Nat. Hist. 1: 137. 1835. Not Presl, 1830.

Panicum digitarioides Carpenter; Steud. Syn. Pl. Gram. 75. 1855.

Panicum Curtisii Chapm. Fl. S. States, 573. 1860. Not Steud. 1855.

Glabrous, culms erect from a long and stout creeping rootstock, 3°–5° tall, simple, stout, smooth. Sheaths smooth; leaves 4′–10′ long, 4″–8″ wide, long-acuminate; panicle linear, 6′–12′ long, its branches 1′–3′ long, erect; spikelets about 1¼″ long, ovate, acute; first scale about one-half as long as the spikelet, acute, 3-nerved; second about 1″ long, 5-nerved and a little exceeded by the 3-nerved third one; the fourth 3-nerved, slightly shorter than the third.

In water, Delaware to Florida and Texas. July–Aug.

4. Panicum obtùsum H.B.K. Blunt Panicum. (Fig. 246.)

Panicum obtusum H.B.K. Nov. Gen. 1: 98. 1815.

Glabrous, culms erect, 1°–2° tall, simple or branching at base, smooth. Sheaths smooth; leaves 2½′–9′ long, 1″–3″ wide, usually erect, long-acuminate; panicle linear, 2′–6′ long; branches ¾′–1½′ long, appressed; spikelets about 1½″ long, crowded, oval or obovoid, obtuse, turgid; first scale shorter than the rest, obtuse, 5-nerved; second, third and fourth scales about equal, the second and third 5-nerved, the fourth chartaceous.

Kansas to Arizona, south to Texas and Mexico. July–Sept.

5. Panicum hians Ell. Gaping Panicum. (Fig. 247.)

Panicum divaricatum Michx. Fl. Bor. Am. 1: 50. 1803. Not L. 1758.

Panicum melicarium Michx. Fl. Bor. Am. 1: 50. 1803?

Panicum hians Ell. Bot. S. C. & Ga. 1: 118. 1817.

Glabrous, culms erect, 1°–2½° tall, generally simple, sometimes creeping at base, smooth. Leaves 3′–5′ long, 1″–3″ wide, acuminate, generally erect; panicle 3′–8′ long; branches few, generally spreading, the longer ones often drooping, the lower naked below the middle; spikelets about 1″ long; fourth scale exceeded by the third and its usually empty palet which is much enlarged, generally forcing the spikelet wide open.

In moist ground, North Carolina to Missouri, south to Florida and Texas. Aug. Sept.

6. Panicum rostràtum Muhl. Beaked Panicum. (Fig. 248.)

Panicum anceps Michx. Fl. Bor. Am. 1: 48. 1803?
Panicum rostratum Muhl. Gram. 121. 1817.

Culms erect from a creeping scaly branched rootstock, 1½°–5° tall, much branched, compressed, stout, smooth. Sheaths compressed, glabrous, or the lower ones pubescent; leaves 1° long or more, 2″–5″ wide, acuminate; ligule very short; panicles pyramidal, 6′–12′ long; axis and ascending branches scabrous; spikelets 1½″ long, crowded, lanceolate, acuminate, curved, longer than the scabrous pedicels; first scale less than one-half as long as the spikelet; second scale about 1½″ long, curved at the apex, scabrous above on the middle nerve; third scale usually subtending a small empty palet.

Moist soil, New Jersey to Illinois and Missouri, south to Florida and Texas. July–Sept.

7. Panicum agrostidifórme Lam. Agrostis-like Panicum. (Fig. 249.)

Panicum agrostidiforme Lam. Tabl. Encycl. 1: 172. 1791.
Panicum agrostoides Trin. Unifl. 212. 1826. Not Muhl. 1817.

Culms erect, 1½°–2° tall, much branched, compressed, smooth. Sheaths compressed, glabrous, or sometimes hairy at the throat; ligule very short, naked; leaves 1° long or more, 2″–4″ wide, acuminate; panicles pyramidal, 4′–12′ long, terminating the culm and branches; primary branches of the panicle spreading, secondary generally appressed; spikelets ¾″ long, acute, straight; first scale 3-nerved, acute; second and third scales 5-nerved, about twice as long as the first and longer than the oval fourth scale, which is slightly stalked; small palet of third scale usually empty.

Wet ground, Maine to Minnesota, south to Florida and Texas. July–Sept.

8. Panicum elongàtum Pursh. Long Panicum. (Fig. 250.)

Panicum elongatum Pursh, Fl. Am. Sept. 69. 1814.
Panicum agrostoides Muhl. Gram. 119. 1817.

Culms erect, 3°–5° tall, much branched, stout, compressed, smooth. Sheaths smooth and glabrous, compressed; leaves 1° long or more, 2″–4″ wide, acuminate, scabrous; panicles pyramidal, terminating the culm and branches, 4′–12′ long; primary branches spreading or ascending, the secondary usually divaricate; spikelets about 1¼″ long, crowded, acuminate; first scale acute or acuminate, one-third the length of the equal and acuminate second and third; fourth scale narrowly elliptic, about one-half as long as the third and raised on a delicate stalk about ¼″ long.

Moist soil, New Jersey and Pennsylvania to Kentucky, Tennessee and North Carolina. July–Sept.

9. Panicum longifòlium Torr. Long-leaved Panicum. (Fig. 251.)

Panicum longifolium Torr. Fl. U. S. 149. 1824.

Culms erect, 1°–2° tall, slender, simple, or occasionally with a single lateral panicle, flattened, smooth and glabrous. Sheaths smooth and glabrous; leaves 8′–12′ long, 1′′–2′′ wide, acuminate into a long, slender point, rough, glabrous; ligule short, pilose; panicles 5′–9′ long; primary branches long and slender, spreading, secondary very short, appressed, generally bearing 1–3 spikelets; spikelets 1′′ long, acuminate; first scale acute about one-half as long as the acuminate second one; third scale equalling the second, acuminate, one-third longer than the elliptic obtuse fourth one.

This seems to be a well-marked species. Its slender simple very much flattened culms, the long and narrow leaves, and the long slender branches of the panicle bearing the spikelets almost racemosely, abundantly distinguish it from any others of this group. Moist soil, New Jersey and Pennsylvania. Aug.–Sept.

10. Panicum sphaerocàrpon Ell. Round-fruited Panicum. (Fig. 252.)

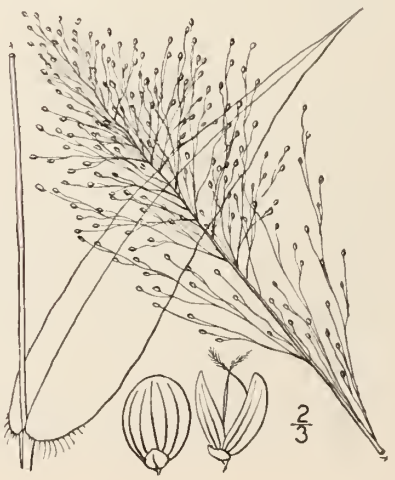
Panicum sphaerocarpon Ell. Bot. S. C. & Ga. 1: 125. 1817.

Culms generally erect, simple or somewhat branched at base, 10′–2° tall, smooth, or the nodes sometimes pubescent. Sheaths usually shorter than the internodes, glabrous, the margins ciliate; leaves 2′–4′ long, 2′′–7′′ wide, acuminate, cordate-clasping at base, scabrous above, smooth beneath, the margins cartilaginous and minutely serrulate, ciliate towards the base; panicle ovoid, 2′–4′ long; spikelets less than 1′′ long, nearly spherical or somewhat longer than thick, obtuse, purple; first scale broadly ovate, obtuse; third and fourth scales three to four times as long as the first, suborbicular, 7-nerved; fourth scale oval, obtuse, ¾′′ long; palet of third scale usually empty.

Dry soil, southern Ontario, New York and Missouri, to Florida, Texas and Mexico. July–Sept.

11. Panicum microcàrpon Muhl. Small-fruited Panicum. (Fig. 253.)

Panicum microcarpon Muhl. Gram. 111. 1817.



Culms generally erect, 2°–3° tall, simple, smooth. Sheaths smooth, glabrous, longer than the internodes; ligule none; leaves 5′–8′ long, ½′–1′ wide, long-acuminate, smooth, cordate-clasping and sparingly ciliate at the base; panicle 3′–8′ long, ovoid to oblong in outline; branches slender, ascending; spikelets ¾′′ long, obovoid to nearly spherical, numerous; first scale minute, second and third about equal, 7-nerved, puberulent, the fourth white and shining; palet of third scale usually empty.

Woods and along thickets, southern New York to Pennsylvania and Michigan, south to Florida, Louisiana, Nebraska and Texas. July–Sept.

12. Panicum Porteriànum Nash. Porter's Panicum. (Fig. 254.)

Panicum latifolium Walt. Fl. Car. 73. 1788. Not L. 1753.
Panicum Walteri Poir. in Lam. Encycl. Suppl. 4: 282. 1816. Not Pursh, 1814.
Panicum latifolium var. *molle* Vasey, Contr. Nat. Herb. 3: 33. 1892. Not *P. molle* Sw. 1788.
Panicum Porterianum Nash, Bull. Torr. Club, 22: 420. 1895.

Culms erect, 1°–2° tall, simple or somewhat dichotomously branched above, the nodes densely barbed. Sheaths generally softly pubescent; leaves ovate to broadly lanceolate, 2′–4′ long, ½′–1¼′ wide, cordate-clasping at base, acute, usually softly pubescent; panicle included or somewhat exserted; branches spreading or ascending, bearing few elliptic short-pedicelled appressed spikelets 2″–2½″ long; first scale one-third to one-half as long as the pubescent and equal second and third ones; fourth scale about as long as the third.

In woods, Maine and Ontario to Minnesota, south to Florida and Texas. June–Aug.

13. Panicum commutàtum Schultes. Variable Panicum. (Fig. 255.)

Panicum nervosum Muhl. Gram. 116. 1817? Not Lam. 1797.
Panicum commutatum Schultes, Mant. 2: 242. 1824.

Culms erect, 1°–2° tall, rather slender, glabrous, or pubescent especially at the nodes, simple, finally dichotomously branched above. Sheaths glabrous or puberulent, generally ciliate; leaves 2′–4′ long, ¼′–1′ wide, sparingly ciliate at the base, acute, glabrous or puberulent, those of the branches generally broader and more crowded than those of the main stem; panicle 2′–5′ long, lax, the branches spreading; spikelets 1″–1¼″ long, ellipsoid; first scale about one-fourth as long as the spikelet, 1-nerved; second and third scales equal, 7-nerved, pubescent; fourth scale oval, obtuse, apiculate, about 1″ long; palet of third scale usually empty.

In dry woods and thickets, New York to Kentucky, south to Florida and Texas. June–Aug.

14. Panicum macrocàrpon Le Conte. Large-fruited Panicum. (Fig. 256.)

Panicum macrocarpon Le Conte; Torr. Cat. 91. 1819.

Culms 1°–3° tall, erect, simple or somewhat branched above, smooth; the nodes, at least the upper ones, naked. Sheaths smooth and glabrous, ciliate; leaves 3′–7′ long, 9″–1½′ wide, cordate-clasping at base, acuminate, smooth and glabrous or nearly so on both surfaces, ciliate; panicle 3′–6′ long, generally long-exserted, rarely included, its branches more or less ascending; spikelets 1½″–2″ long, turgid, oval to obovoid; second and third scales broadly oval, obtuse, 9-nerved, pubescent, the fourth oval, rather acute, 1½″ long.

The more simple culms, glabrous sheaths, leaves and nodes and the turgid spikelets readily distinguish this species from either *P. Porterianum* or *P. clandestinum*. Moist places, Vermont to New York, New Jersey and Pennsylvania. July–Aug.

15. Panicum clandestìnum L. Hispid Panicum. (Fig. 257.)

Panicum clandestinum L. Sp. Pl. 58. 1753.
Panicum pedunculatum Torr. Fl. U. S. 141. 1824.

Culms erect or ascending, 1½°–4° tall, rather stout, simple at first, much branched later in the season. Sheaths longer than the internodes, much crowded on the branches, papillose-hispid, especially the upper ones; leaves 2′–8′ long, ½′–1¼′ wide, cordate-clasping at base, acuminate, smooth and glabrous, the margins ciliate at base; primary panicle sometimes long-exserted; panicles of the branches below included in the sheaths, rarely slightly exserted; spikelets 1″–1¼″ long, ellipsoid; first scale about one-third as long as the spikelet; second and third oval, acutish, 9-nerved, the fourth oval, obtuse, apiculate, whitish, shining.

In thickets, Quebec to Michigan, south to Georgia, Missouri and Texas. June–July.

16. Panicum xanthóphysum A. Gray. Slender Panicum. (Fig. 258.)

Panicum xanthophysum A. Gray, Ann. Lyc. N. Y. 3: 233. 1835.

Culms erect, 1°–2° tall, simple. Sheaths sparingly papillose-pubescent; ligule very short; leaves 3′–6′ long, ⅓′–¾′ wide, rounded at base, long-acuminate, erect, smooth and glabrous; panicle long-exserted, linear, 1½′–4′ long, its branches appressed; spikelets few, about 1½″ long, obovoid, pubescent or glabrate; first scale about one-half as long as the nearly equal obtuse second and third; fourth scale indurated and shining, elliptic or oval.

Dry soil, Maine and Ontario to Manitoba, south to New Jersey and Pennsylvania. Plant light green, becoming yellowish in drying. June–Aug.

17. Panicum Scribneriànum Nash. Scribner's Panicum. (Fig. 259.)

Panicum scoparium var. *minor* Scribn. Bull. Univ. Tenn. 7: 48. 1894. Not *P. capillare* var. *minus* Muhl. 1817.
Panicum scoparium S. Wats. in A. Gray, Man. Ed. 6, 632. 1890. Not Lam. 1797.
Panicum pauciflorum A. Gray, Man. 613. 1848. Not Ell. 1817.
Panicum Scribnerianum Nash, Bull. Torr. Club, 22: 421. 1895.

Culms erect, 6′–2° tall, simple or late in the season dichotomously branched above, sparingly pubescent. Sheaths strongly papillose-hispid, sometimes glabrate; leaves 2′–4′ long, 3″–6″ wide, rounded or truncate at base, acuminate, more or less spreading, smooth above, scabrous beneath; panicles small, the primary one exserted, ovoid, 1½′–3′ long, the secondary ones much smaller and more or less included; branches of the primary panicle spreading, 8″–1½′ long, often flexuous; spikelets turgid, obovoid, about 1½″ long.

In dry or moist soil, Maine and Ontario to Minnesota, south to Virginia, Kansas and Arizona. June–Aug.

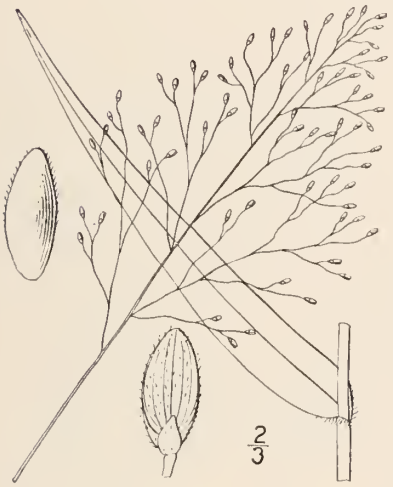
18. Panicum Wilcoxiànum Vasey. Wilcox's Panicum. (Fig. 260.)

Panicum Wilcoxianum Vasey, Bull. U. S. Dept. Agric. Bot. Div. 8: 32. 1889.

Culms erect, 6′–10′ tall, sparingly pubescent. Sheaths papillose-pubescent; ligule a ring of hairs; leaves 1½′–3′ long, less than 2″ wide, long-acuminate, strongly pubescent with long hairs; panicle about 1½′ long, oblong to ovoid, compact; branches less thau 1′ long, spreading or ascending, flexuous; spikelets about 1¼″ long, ellipsoid; first scale about oue-quarter as long as thc spikelet; secoud aud third scales about equal, pubesceut; fourth scale about as long as the third, obtuse.

In dry soil, Nebraska. July–Aug.

19. Panicum boreàle Nash. Northern Panicum. (Fig. 261.)



Panicum boreale Nash, Bull. Torr. Club, 22: 421. 1895.

Culms at first erect and simple, 1°–2° tall, later decumbent and somewhat branched, smooth and glabrous. Sheaths shorter than the internodes, usually smooth, ciliate; ligule short, ciliate; leaves 3′–5′ long, ¼′–½′ wide, erect, truncate or rounded at the sparsely ciliate base, acuminate; pauicle 2′–4′ long, ovoid, its branches 1′–2′ long, spreading or ascendiug; spikelets 1″ long, about equalling the pedicels, ellipsoid, somewhat pubescent; first scale ovate, obtuse, about oue-third as long as the spikelet; second and third scales oblong-ovate, 7-nerved, pubescent, equalling the fourth, which is oval, acute, and slightly more than ¾″ loug; palet of third scale usually empty.

Moist soil, Newfoundland and Ontario to New York, Vermont and Minnesota. Summer.

20. Panicum laxiflòrum Lam. Lax-flowered Panicum. (Fig. 262.)

Panicum laxiflorum Lam. Encycl. 4: 748. 1797.

Culms erect, 8′–16′ tall, simple, pubescent or glabrate. Sheaths shorter thau thc internodes, hirsute; leaves 2½′–5′ long, 2″–5″ wide, erect, generally narrowed at base, long-acuminate, pubescent or glabrate; panicle 2′–4′ long, its axis and erect or spreading branches sometimes hirsute; spikelets about 1″ long, ellipsoid or narrowly obovoid, strongly pubescent; first scale minute, 1-uerved; second and third about equal, 9-uerved, very pubescent, as long as the shining obtuse miuutely apiculate fourth one; third scale usually with an empty palet.

Moist soil, Virginia to Kentucky, south to Florida. Also reported from much further north. It has been confounded with the preceding species. June–Aug.

21. Panicum nítidum Lam. Shining Panicum. (Fig. 263.)

Panicum nitidum Lam. Encycl. 4: 748. 1797.

Culms at first simple, 12′–18′ tall, later profusely dichotomously branched, 2°–3° long. Sheaths glabrous to pubescent; ligule pilose; leaves glabrous to sparingly hirsute, truncate or slightly rounded at base, the primary ones 1′–3′ long, 1½″–3″ wide, erect, those of the branches ½′–1′ long, 1″ wide or less; primary panicle long-exserted, 1′–2′ long, ovoid, those of the branches smaller and exceeded by the leaves; spikelets about ½″ long, obovoid, pubescent, usually purple; first scale about one-third as long as the spikelet, 1-nerved; second and third scales broadly oval or orbicular, 7-nerved, shining; fourth scale minutely apiculate, ½″ long.

Common in dry sandy soil, in the Eastern and Middle States, and probably much more widely distributed. June–Aug.

22. Panicum dichótomum L. Forked Panicum. (Fig. 264.)

Panicum dichotomum L. Sp. Pl. 58. 1753.
Panicum ramulosum Michx. Fl. Bor. Am. 1: 50. 1803.

Smooth and glabrous, or the lower nodes barbed, culms erect, ½°–2° tall, at first simple, later profusely dichotomously branched at about the middle. Leaves light green, widely spreading, generally much narrowed toward the base, the primary ones distant, 2′–3′ long, 2″–3″ wide, those of the branches 1′ long or less, ½″–1″ wide, sometimes involute; primary panicle usually long-exserted, 1′–2′ long; branches lax, spreading, bearing few spikelets; secondary panicles smaller, not exceeding the leaves, their branches with very few spikelets; spikelets about 1″ long, ellipsoid, glabrous.

In woodlands and thickets, New York to Kentucky, Missouri and southward. June–July.

23. Panicum barbulàtum Michx. Barbed Panicum. (Fig. 265.)

Panicum barbulatum Michx. Fl. Bor. Am. 1: 49. 1803.

Culms at first simple, erect, 2°–3° tall, later profusely branched for their whole length, 3°–4° long, prostrate or leaning, the nodes strongly barbed. Leaves smooth and glabrous, generally truncate or rounded at the base, the primary ones 3′–5′ long, about ½′ wide, widely spreading, the lower ones usually reflexed, those of the branches ½′–2′ long, 1″–2″ wide; primary panicle 3′–5′ long, exserted, ovoid, its branches ascending, rigid; secondary panicles smaller, lax, not exceeding the leaves, the branches bearing few spikelets; spikelets about ¾″ long, ellipsoid, purple, glabrous; first scale about one-third as long as the spikelet, acute.

Moist soil, New York to Tennessee, south to Florida and Texas. June–Aug.

24. Panicum viscidum Ell. Velvety Panicum. (Fig. 266.)

Panicum scoparium Michx. Fl. Bor. Am. 1: 49. 1803. Not Lam. 1797.
Panicum viscidum Ell. Bot. S. C. & Ga. 1: 123. *pl. 7. f. 3.* 1817.

Culms erect, 2°–4° tall, simple or at length much branched above, villous. Sheaths shorter than the internodes, villous; leaves generally narrowed, sometimes rounded or truncate at base, softly pubescent, those of the culm 4′–7′ long, 5″–8″ wide, distant, those of the branches 1′–2½′ long, 2″–5″ wide, crowded; primary panicle 3′–6′ long, ovoid, branches ascending; secondary panicles much smaller, not exceeding the leaves; spikelets ovoid to oval, about 1¼″ long, pubescent; first scale broadly ovate, about one-fourth as long as the spikelet; second and third scales nearly orbicular, 9-nerved, pubescent, the fourth oval, apiculate, 1″ long.

Moist soil, New Jersey to Indiana and the Indian Territory, south to Florida and Texas. Not viscid. June–Aug.

25. Panicum pubéscens Lam. Hairy Panicum. (Fig. 267.)

Panicum pubescens Lam. Encycl. 4: 748. 1797.
Panicum lanuginosum Ell. Bot. S. C. & Ga. 1: 123. 1817.

Culms at first erect and simple, later profusely branched and leaning or ascending, glabrous or pubescent. Sheaths hirsute to villous, often papillose; leaves rounded, truncate or often narrowed at the base, pubescent or glabrate, generally more or less spreading, those of the culm 2′–3′ long, those of the branches much shorter; primary panicles less than 3′ long, ovoid, their branches ascending; lateral panicles much smaller, not exceeding the leaves; spikelets hardly 1″ long, pubescent.

In dry soil, common in the Eastern and Middle States, its western and southern range undetermined. June–Aug.

Panicum lanuginòsum Ell., here regarded as referable to this species, may prove to be distinct.

26. Panicum depauperàtum Muhl. Starved Panicum. (Fig. 268.)

Panicum strictum Pursh, Fl. Am. Sept. 69. 1814. Not R. Br. 1812.
Panicum depauperatum Muhl. Gram. 112. 1817.
Panicum involutum Torr. Fl. U. S. 124. 1824.

Culms erect, 1° tall or less, simple or branched at base. Sheaths glabrous to hirsute; leaves erect, elongated, ½″–2″ wide, mostly crowded at base and equalling or one-half as long as the culm, the upper culm leaf often much exceeding the panicle; primary panicle generally much exserted from the upper sheath, 1′–3′ long, usually linear, its branches mostly erect; secondary panicles on very short basal branches and often concealed by the lower leaves; spikelets about 1½″ long.

In dry places, Nova Scotia to Manitoba, south to Florida and Texas. June–Sept.

27. Panicum angustifòlium Ell. Narrow-leaved Panicum. (Fig. 269.)

Panicum angustifolium Ell. Bot. S. C. & Ga. 1: 129. 1817. *Panicum consanguineum* S. Wats. in A. Gray, Man. Ed. 6, 633, in part. 1890. Not Kunth, 1835.

Culms erect, 1°–2° tall, glabrous, at first simple, later profusely branched above. Sheaths glabrous or the basal ones pubescent, those on the culm shorter than the internodes, those on the branches crowded; leaves elongated, 1″–3″ wide, narrowed to the base, firm, glabrous, those of the culm distant, those of the branches shorter and crowded; primary panicle long-exserted, 1′–3′ long, its branches ascending or erect; lateral panicles smaller, shorter than the leaves; spikelets few, about 1¼″ long, elliptic to obovoid; first scale one-fourth to one-third as long as the spikelet; second and third oval, 9-nerved, pubescent; fourth oval, minutely pubescent at the apex.

Dry soil, North Carolina to Missouri, south to Florida and Texas. June–Aug.

28. Panicum virgàtum L. Tall Smooth Panicum. (Fig. 270.)

Panicum virgatum L. Sp. Pl. 59. 1753.

Culms erect from a creeping rootstock, 3°–5° tall, glabrous. Sheaths smooth and glabrous; leaves elongated, 1° or more long, 3″–6″ wide, flat, long-acuminate, narrowed toward the base, glabrous, rough on the margins; panicle 6′–20′ long, the lower branches 4′–10′ long, more or less widely spreading or sometimes nearly erect; spikelets ovate, acuminate, 2″–2¼″ long; first scale acuminate, about one-half as long as the spikelet, 3–5-nerved; second scale generally longer than the others, 5–7-nerved, the third similar and usually subtending a palet and staminate flower; fourth scale shining, shorter than the others.

In moist or dry soil, Maine and Ontario to Minnesota, south to Florida, Kansas and Texas. Aug.–Sept.

29. Panicum amàrum Ell. Sea-beach Panicum. (Fig. 271.)

Panicum amarum Ell. Bot. S. C. & Ga. 1: 121. 1817.

Smooth and glabrous, glaucous, culms arising from long branching rootstocks, 1°–3° tall, decumbent. Sheaths overlapping; leaves 6′–1° long, 3″–6″ wide, long-acuminate, thick and leathery, involute on the margins, at least toward the apex, the uppermost leaf generally exceeding the panicle; panicle linear, less than 1° long, its branches erect; spikelets 2½″–3″ long; first, second and third scales acuminate, the first one-half to two-thirds as long as the spikelet, the third somewhat longer than the second, usually with a palet and staminate flower, the fourth elliptic, about 1¾″ long.

On sea-beaches, Connecticut to Florida. Sept.–Nov.

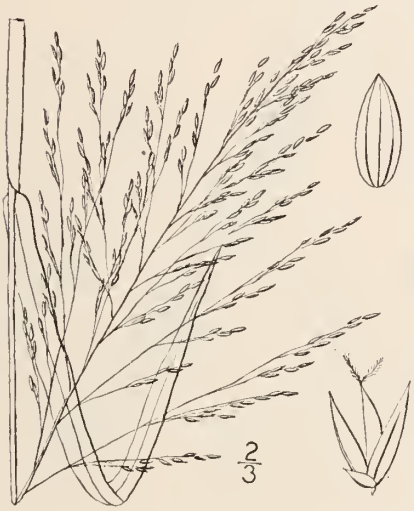
30. Panicum miliàceum L. Millet. (Fig. 272.)

Panicum miliaceum L. Sp. Pl. 58. 1753.

Culms erect or decumbent, rather stout, 1° or more tall, glabrous or hirsute. Sheaths papillose-hirsute; leaves 5′–10′ long, ⅓′–1′ wide, more or less pubescent; panicle rather dense, 4′–10′ long; branches erect or ascending; spikelets 2″–2½″ long, acuminate; first scale about two-thirds as long as the spikelet, acuminate, 5–7-nerved; second scale 2″–2½″ long, acuminate, 13-nerved, somewhat exceeding the 7–13-nerved acuminate third one, which subtends an empty palet; fourth scale shorter than the third, becoming indurated, obtuse.

In waste places, Maine to New York, New Jersey and Pennsylvania. Adventive from the Old World. July–Sept.

31. Panicum prolíferum Lam. Spreading Panicum. (Fig. 273.)



Panicum proliferum Lam. Encycl. 4: 747a. 1797.
Panicum geniculatum Muhl. Gram. 123. 1817.

Culms at first erect, 1°–2° tall, simple, later decumbent and geniculate, 4°–6° long, branched at all the upper nodes. Sheaths loose, glabrous, somewhat flattened; ligule ciliate; leaves 6′–2° long, 2″–10″ wide, long-acuminate, scabrous on the margins and occasionally on the nerves; panicle pyramidal, 4′–16′ long, lower branches 3′–6′ long, at length widely spreading; spikelets 1″–1½″ long, crowded, lanceolate, acute, glabrous, sometimes purplish; first scale about one-fourth as long as the spikelet, enclosing its base; second and third scales about equal, acute, 5–7-nerved; fourth scale elliptic, shining, somewhat shorter than or equalling the third.

In wet soil, Maine to Pennsylvania and Nebraska, south to Florida and Texas. July–Sept.

32. Panicum capillàre L. Witch Grass. Tumble-weed. (Fig. 274.)

Panicum capillare L. Sp. Pl. 58. 1753.

Culms erect or decumbent, 1°–2° tall, simple or sometimes sparingly branched. Sheaths papillose-hirsute; leaves 6′–1° long, 3″–8″ wide, more or less pubescent; terminal panicle generally 8′–14′ long, lower branches at first included in the upper sheath, finally exserted and widely spreading, 6′–10′ long; lateral panicles, when present, smaller; spikelets 1″–1¼″ long, acuminate; first scale one-fourth to one-half as long as the spikelet; second and third scales nearly equal, very acute, the fourth ¾″ long.

In dry soil, common as a weed in cultivated fields, Nova Scotia to British Columbia, south to Florida, Nevada and Texas. July-Sept.

Panicum capillàre Gattingèri Nash.

Panicum capillare var. *campestre* Gattinger, Tenn. Fl. 94. 1887. Not *P. campestre* Nees, 1829.

Culms more slender than in the type; terminal panicle rarely over 6′ long, the lateral ones very numerous. Moist places, New Jersey to Tennessee, Missouri and southward.

33. Panicum flexile (Gattinger) Scribn. Wiry Panicum. (Fig. 275.)

Panicum capillare var. *flexile* Gattinger, Tenn. Fl. 94. 1887.

Panicum flexile Scribn. Bull. Torr. Club, 20: 476. 1893.

Culms erect, 6′–18′ tall, slender, simple or somewhat branched at base, bearded at the nodes. Sheaths papillose-hirsute; leaves 4′–9′ long, 2″–3″ wide, erect, long-acuminate, more or less pubescent; panicle 4′–9′ long, narrowly ovoid to oblong in outline, its branches ascending, the lower ones 2′–3½′ long; spikelets 1½″ long, much shorter than the pedicels, acuminate; first scale about one-fourth as long as the spikelet; second and third scales about equal, 5–7 nerved; fourth scale elliptic, somewhat shorter than the third.

In moist or dry soil, Pennsylvania to Tennessee and Missouri. Aug.–Oct.

34. Panicum autumnale Bosc. Diffuse Panicum. (Fig. 276.)

Panicum nudum Walt. Fl. Car. 73. 1788?
Panicum divergens Muhl. Gram. 120. 1817. Not H.B.K. 1815.
Panicum autumnale Bosc; Spreng. Syst. 1: 320. 1825.

Culms erect or decumbent, 1°–2° tall, generally much branched at the base, slender. Sheaths shorter than the internodes, the upper glabrous, the lower sometimes densely pubescent; leaves 1½′–4′ long, 1″–3″ wide, ascending, acuminate, glabrous; panicle 5′–12′ long, bearded in the axils, the lower branches 4′–8′ long, at first erect with the lower portion included in the upper sheath, finally exserted and widely spreading at maturity; spikelets lanceolate, about 1½″ long, acuminate, glabrous or pubescent, on capillary pedicels of many times their length; first scale minute; second and third equal, acute, glabrous or sometimes villous, the fourth lanceolate, 1¼″ long.

In dry soil, Illinois to Georgia and Florida, west to Minnesota, Kansas and Arizona. July–Sept.

35. Panicum minus (Muhl.) Nash. Wood Panicum. (Fig. 277.)

Panicum capillare var. *minor* Muhl. Gram. 124. 1817.
Panicum capillare var. *sylvaticum* Torr. Fl. 149. 1824. Not *P. sylvaticum* Lam. 1797.
Panicum diffusum Pursh, Fl. Am. Sept. 1: 68. 1814. Not Sw. 1788.
Panicum minus Nash, Bull. Torr. Club, 22: 421. 1895.

Culms erect, or occasionally decumbent, 8′–2° long, slender, somewhat branched at base. Sheaths hirsute; leaves 2′–4′ long, 1″–3″ wide, erect, more or less pubescent; panicle 4′–9′ long, its lower branches 3′–4′ long, spreading or ascending; spikelets about ¾″ long, elliptic, acute, smooth, borne in pairs at the extremities of the ultimate divisions of the panicle; first scale about one-third as long as the equal acute second and third ones, the fourth somewhat shorter than the third.

In dry woods and thickets, New Brunswick to Georgia, west to Missouri. Aug.–Sept.

36. Panicum verrucòsum Muhl. Warty Panicum. (Fig. 278.)

Panicum verrucosum Muhl. Gram. 113. 1817.

Panicum debile Ell. Bot. S. C. & Ga. 1: 129. 1817. Not Desf. 1800.

Culms erect or decumbent, slender, generally much branched at base. Sheaths glabrous, much shorter than the internodes; ligule short, ciliate; leaves 2′–7′ long, 1″–4″ wide, erect or ascending, glabrous, rough on the margins; panicle 3′–12′ long, its lower branches 2′–6′ long, naked below, strict and ascending, or lax and spreading; spikelets about ¾″ long, elliptic, acutish, borne in pairs along the branches, the first scale about one-quarter as long as the warty second and third, the fourth scale apiculate.

Moist soil, Massachusetts to Florida, west to Louisiana, mostly near the coast. July–Sept.

37. Panicum gíbbum Ell. Gibbous Panicum. (Fig. 279.)

Panicum gibbum Ell. Bot. S. C. & Ga. 1: 116. 1817.

Culms erect from a creeping base, 2°–6° tall, dichotomously branched below. Lower sheaths densely hirsute, the upper generally glabrous; leaves 3′–7′ long, 2″–10″ wide, usually spreading, more or less pubescent; panicle 3′–9′ long, dense and contracted; branches ½′–1′ long, erect; spikelets 1½″–2″ long, elliptic, somewhat acute; first scale about one-quarter as long as the spikelet; second scale gibbous at base, 11-nerved; third scale about equalling the second, 7-nerved, empty, the fourth one shorter than the second.

Swamps, Virginia to Tennessee, south to Florida and Louisiana. Also in Cuba. July–Sept.

13. IXÓPHORUS Schlecht. Linnaea, 31: 420. 1861–2.

[Setaria Beauv. Agrost. 113. 1812. Not Ach. 1798.]

Mostly annual grasses with erect culms, flat leaves, the inflorescence in spike-like panicles. Spikelets 1-flowered, or rarely with a second staminate flower, the basal bristles single or in clusters below the articulation of the rachilla, and therefore persistent. Scales of the spikelet 4, the three outer membranous, the third often subtending a palet and rarely a staminate flower; the inner or fourth scale chartaceous, subtending a palet of similar texture and a perfect flower. Stamens 3. Styles distinct, elongated. Stigmas plumose. Grain free, enclosed in the scales. [Greek, in reference to the viscid spikelets of some species.]

Species about 10, in temperate and tropical regions. Those occurring in our range are introduced from the Old World.

Bristles downwardly barbed. 1. *I. verticillatus.*
Bristles upwardly barbed.
Mature fourth scale of spikelet oval in outline, very convex, almost hemispheric, coarsely transversely rugose. 2. *I. glaucus.*
Mature fourth scale generally elliptic in outline, only moderately convex, finely transversely rugose or pitted, striate.
Spikes 1′–3½′ long, ½′ or less thick; spikelets about 1″ long, always much exceeded by the green bristles. 3. *I. viridis.*
Spikes 4′–9′ long, ½′–2′ thick; spikelets about 1¼″ long, equalled or exceeded by the usually purplish bristles. 4. *I. Italicus.*

1. Ixophorus verticillàtus (L.) Nash. Foxtail-grass. (Fig. 280.)

Panicum verticillatum L. Sp. Pl. Ed. 2, 82. 1762.
Setaria verticillata Beauv. Agrost. 51. 1812.
Chamaeraphis verticillata Porter, Bull. Torr. Club. 20: 196. 1893.
Ixophorus verticillatus Nash. Bull. Torr. Club, 22: 422. 1895.

Culms erect or decumbent, 1°–2° tall, more or less branched. Sheaths glabrous; leaves 2′–8′ long, ¼′–½′ wide, scabrous above; spikes 2′–3′ long; spikelets about 1″ long, equalled or exceeded by the downwardly barbed bristles; first scale less than one-half as long as the spikelet, 1-nerved; second and third scales 5–7-nerved, equalling the oval fourth one; palet of third scale empty.

About dwellings and in waste places, Nova Scotia and Ontario to New Jersey and Kentucky. Naturalized from Europe. July-Sept.

2. Ixophorus glaùcus (L.) Nash. Yellow Foxtail. Pigeon-grass. (Fig. 281.)

Panicum glaucum L. Sp. Pl. 56. 1753.
Setaria glauca Beauv. Agrost. 51. 1812.
Chamaeraphis glauca Kuntze, Rev. Gen. Pl. 767. 1891.
Ixophorus glaucus Nash, Bull. Torr. Club, 22: 423. 1895.

Culms erect or sometimes decumbent, 1°–4° tall, more or less branched. Sheaths glabrous; leaves 2′–6′ long, 2″–4″ wide; spikes 1′–4′ long; spikelets 1¼″–1½″ long, oval, much shorter than the upwardly barbed yellowish brown bristles; first scale 1–3-nerved, somewhat shorter than the 5-nerved second one; third scale 5-nerved, equalling the fourth which is coarsely transversely rugose, very convex, V-shaped in cross-section, about twice as long as the second; palet of third scale usually empty.

In waste places and cultivated grounds, throughout North America except the extreme north. Often a troublesome weed. Naturalized from Europe. July-Sept.

3. Ixophorus víridis (L.) Nash. Green Foxtail-grass. (Fig. 282.)

Panicum viride L. Sp. Pl. Ed. 2, 83. 1762.
Setaria viridis Beauv. Agrost. 51. 1812.
Chamaeraphis viridis Porter, Bull. Torr. Club. 20: 196. 1893.
Ixophorus viridis Nash, Bull. Torr. Club, 22: 423. 1895.

Culms erect or ascending, 1°–3° tall, simple or branched. Sheaths glabrous; leaves 3′–10′ long, 2″–6″ wide, usually scabrous above; spikes 1′–4′ long; spikelets about 1″ long, elliptic, much shorter than the green, or sometimes yellowish, upwardly barbed bristles; first scale less than one-half as long as the spikelet, 1–3-nerved; second and third scales 5-nerved; fourth scale finely and faintly transversely rugose, or pitted, striate, only moderately convex, equalling or slightly exceeding the second; palet of third scale usually empty.

In waste places and cultivated grounds, throughout North America except the extreme north, and often a troublesome weed. Naturalized from Europe. July-Sept.

4. Ixophorus Itálicus (L.) Nash. Italian Millet. Hungarian Grass. Fig. 283.

Panicum Italicum L. Sp. Pl. 56. 1753.
Setaria Italica R. & S. Syst. 2: 493. 1817.
Chamaeraphis Italica Kuntze. Rev. Gen. Pl. 768. 1891.
Ixophorus Italicus Nash. Bull. Torr. Club. 22: 423. 1895.

Culms erect, 2°–5° tall. Sheaths smooth or scabrous; leaves 6′–1° or more in length, ¼′–1½′ wide, generally scabrous; spikes 4′–9′ long, ½′–2′ thick, usually very compound; spikelets about 1¼″ long, elliptic equalled, or exceeded by the upwardly barbed generally purplish bristles; first scale less than one-half as long as the spikelet, 1–3-nerved; second and third 5–7-nerved; fourth scale equalling or somewhat exceeding the second, finely and faintly transverse-rugose, or pitted, striate, only moderately convex; palet of third scale minute or wanting.

In waste places, escaped from cultivation, Quebec to Minnesota, south to Florida and Texas. Native of the Old World. July–Sept.

14. CÉNCHRUS L. Sp. Pl. 1049. 1753.

Annual or perennial grasses with usually flat leaves. Inflorescence in spikes. Spikelets subtended by a spiny involucre which is deciduous with them at maturity. Scales 4: the first hyaline; the second and third membranous, the latter sometimes having a palet and staminate flower in its axil; the fourth chartaceous, subtending a palet of similar structure which encloses a perfect flower. Stamens 3. Styles united below. Stigmas plumose. Grain free, enclosed in the scales. [Ancient Greek name for some grass, probably Millet.]

About 12 species, in tropical and temperate regions. Besides the following some 4 others occur in the southern parts of North America.

1. Cenchrus tribuloides L. Bur-grass. Hedgehog-grass. Fig. 284.

Cenchrus tribuloides L. Sp. Pl. 1050. 1753.
Cenchrus Carolinianus Walt. Fl. Car. 79. 1788.

Culms erect or decumbent from an annual root, usually robust, 8′–2½° long, branching freely. Sheaths usually very loose, compressed, smooth; leaves 2½′–5′ long, 2″–4″ wide, flat or somewhat complanate; spikes 1′–2½′ long, sometimes partially included in the upper sheath; involucres crowded on the scabrous rachis, 2-flowered, globose, pubescent except at the base, forming spiny burs, the spines stout; spikelets about 3″ long.

On sandy shores and in waste places, Maine and Ontario to Minnesota, south to Florida, Colorado and Texas. Sometimes a noxious weed. Apparently perennial in the Southern States. Aug.–Sept.

15. ZIZANIÓPSIS Doell & Aschers. in Mart. Fl. Bras. 2: Part 2, 12. 1871.

Tall aquatic monoecious grasses, with long flat leaves and paniculate inflorescence. Spikelets 1-flowered, the staminate borne at the top of the branches, the pistillate at the base. Scales 2, nearly equal, membranous, the outer one in the pistillate spikelets broad, acute and bearing an awn. Stamens 6. Styles united. Grain nearly globose, the pericarp readily separable. [Name in allusion to the resemblance of this grass to *Zizania*.]

A monotypic genus, of temperate and tropical America.

1. Zizaniopsis miliàcea (Michx.) Doell & Aschers. Zizaniopsis. (Fig. 285.)

Zizania miliacea Michx. Fl. Bor. Am. 1: 74. 1803.

Zizaniopsis miliacea Doell & Aschers.; Baill. Hist. Pl. 12: 293. 1893.

Culms 4°–15° tall from a long and creeping rootstock, robust, glabrous. Sheaths loose, glabrous; ligule 4″–7″ long, thin-membranous; leaves 1° long or more, ½′–1′ wide, smooth, glabrous; panicle dense, 1°–1½° long, narrow; branches erect; staminate spikelets 3″–4″ long, the outer scale 5-nerved, the inner 3-nerved, both acute; pistillate spikelets about 3″ long, the outer scale about equalling the inner, bearing an awn 1″–3″ long, scabrous, 5-nerved; inner scale 3-nerved, acute.

Swamps, Georgia to Ohio (according to Riddell), south to Florida and Texas. June–July.

16. ZIZÀNIA L. Sp. Pl. 991. (1753.)

A tall aquatic monoecious grass with long flat leaves and an ample panicle. Spikelets 1-flowered, the pistillate borne on the upper branches of the panicle, the staminate on the lower. Scales 2, membranous, the outer somewhat longer, acute in the staminate, long-awned in the pistillate spikelets. Stamens 6. Styles nearly distinct. Grain linear, 5″–8″ long. [From an ancient Greek name for Darnel.]

A monotypic genus of North America and Asia.

1. Zizania aquática L. Wild Rice. Indian Rice. Water Oats. Reed. (Fig. 286.)

Zizania aquatica L. Sp. Pl. 991. 1753.

Culms erect from an annual root, 3°–10° tall, smooth and glabrous. Sheaths loose, glabrous; ligule about ¼′ long, thin-membranous; leaves 1° or more long, ¼′–1½′ wide, more or less roughened, especially above, glabrous; panicle 1°–2° long, the upper branches erect, the lower widely spreading; staminate spikelets 3″–6″ long, scales acute or awn-pointed, outer 5-nerved, the inner 3-nerved; scales of the linear pistillate spikelets 4″–12″ long, the outer one 5-nerved, with an awn 1′–2′ long, the inner narrower, 3-nerved, awn-pointed.

In swamps, New Brunswick to Manitoba, south to Florida, Louisiana and Texas. June–Oct.

17. HOMALOCÉNCHRUS Mieg.; Hall. Hist. Stirp. Helv. 2: 201. 1768.

[Leersia Sw. Nov. Gen. & Sp. 21. 1788. Not Hedw. 1782.]

Marsh grasses with flat narrow generally rough leaves, and paniculate inflorescence. Spikelets 1-flowered, perfect, strongly flattened laterally, and usually more or less imbricated. Scales 2, chartaceous, the outer one broad and strongly conduplicate, the inner much narrower. Stamens 1–6. Styles short, distinct. Stigmas plumose. Grain ovoid, free. [Grcek, in reference to the supposed resemblance of these grasses to Millet.]

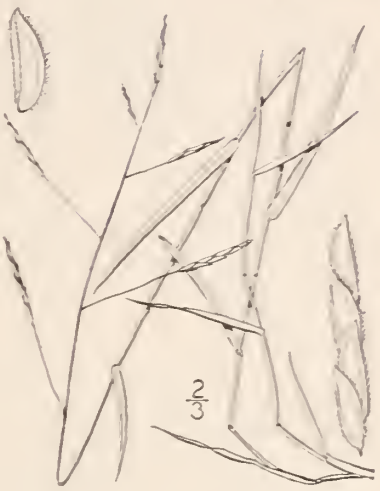
About 5 species, natives of temperate and tropical countries. Besides the following, 2 others occur in the southern United States.

Spikelets oblong, their width less than one-half their length, somewhat imbricated.
- Spikelets 1¼″–1½″ long; panicle-branches usually rigid. 1. *H. Virginicus.*
- Spikelets 2″–2½″ long; panicle-branches generally lax. 2. *H. oryzoides.*

Spikelets oval, their width more than one-half their length, much imbricated. 3. *H. lenticularis.*

1. Homalocenchrus Virgínicus (Willd.) Britton. White Grass. Fig. 287.

Leersia Virginica Willd. Sp. Pl. 1: 325. 1797.
Asprella Virginica R. & S. Syst. 2: 266. 1817.
Homalocenchrus Virginicus Britton. Trans. N. Y. Acad. Sci. 9: 14. 1889.



Culms glabrous, decumbent, 1°–3° long, much branched, slender, smooth. Sheaths usually shorter than the internodes; ligule short; leaves 2′–6′ long, 1″–8″ wide, acute, usually narrowed toward the base, scabrous; terminal panicle finally long-exserted, 3′–8′ long, its branches generally spreading, usually naked below the middle; lateral panicles smaller and usually included; spikelets 1¼″–1½″ long, about ½″ wide, oblong, appressed; outer scale hispid on the keel and margins; inner scale hispid on the keel; stamens 1 or 2.

Swamps or wet woods, Maine to Ontario and Minnesota, south to Florida, Kansas and Texas. Aug.–Sept.

2. Homalocenchrus oryzoides (L.) Poll. Rice Cut-grass. Fig. 288.

Phalaris oryzoides L. Sp. Pl. 55. 1753.
Homalocenchrus oryzoides Poll. Hist. Pl. Palat. 1: 52. 1776.
Leersia oryzoides Sw. Fl. Ind. Occ. 1: 132. 1797.

Culms glabrous, decumbent, 1°–4° long, much branched, rather stout, smooth. Sheaths shorter than the internodes, very rough; ligule very short; leaves 3′–10′ long, 2″–5″ wide, acute, narrowed toward the base, scabrous; terminal panicle 5′–9′ long, finally long-exserted, its branches lax, naked at the base, at first erect, later more or less widely spreading; lateral panicles generally included; spikelets 2″–2½″ long, about ¼″ wide, elliptic; scales pubescent, the outer one hispid on the keel and on the margins; inner scale much narrower, hispid on the keel; stamens 3; anthers yellow.

In swamps and along streams, often forming dense tangled masses, Nova Scotia to western Ontario, south to Florida, Kansas and Texas. Also in the temperate parts of Europe and Asia. Aug.–Sept.

3. Homalocenchrus lenticulàris (Michx.) Scribn. Catch-fly Grass. Fig. 289.

Leersia lenticularis Michx. Fl. Bor. Am. 1: 39. 1803.
Homalocenchrus lenticularis Scribn. Mem. Torr. Club, 5: 33. 1894.

Culms glabrous, erect, 2°–4° tall, usually simple, smooth. Sheaths shorter than the internodes, scabrous; ligule very short; leaves 4′–12′ long, 4″–10″ wide, acute, more or less narrowed at the base, scabrous; panicle 4½′–9′ long, finally exserted, its branches lax, naked below, at first erect, later spreading; spikelets much imbricated, 2″–2½″ long, 1″–1¾″ wide, broadly oval; scales smooth or sparingly hispid-scabrous, the outer one strongly 3-nerved, hispid on the keel and margins, the inner much narrower, strongly 1-nerved, hispid on the keel; stamens 2.

Wet grounds, Virginia to Illinois and Missouri, south to Florida and Texas. July–Sept.

18. PHÁLARIS L. Sp. Pl. 54. 1753.

Annual or perennial grasses with flat leaves, the inflorescence spike-like, capitate or a narrow panicle. Spikelets crowded, 1-flowered. Scales 5, the first and second about equal in length, strongly compressed laterally, usually wing-keeled; third and fourth scales much smaller or reduced to mere rudiments; fifth scale subtending a palet similar to itself and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, smooth, enclosed in the scales. [Greek, alluding to the shining grain.]

About 10 species, mostly natives of southern Europe. Besides the following, 3 others occur in the United States.

Outer scales not winged; inflorescence a narrow panicle. 1. *P. arundinacea.*
Outer scales broadly winged; inflorescence a spike or spike-like panicle.
Spikelets narrow; third and fourth scales much reduced, rigid, subulate, hairy. 2. *P. Caroliniana.*
Spikelets broad; third and fourth scales thin-membranous, broadly lanceolate, glabrous or sparingly hairy. 3. *P. Canariensis.*

1. Phalaris arundinàcea L. Reed Canary-grass. (Fig. 290.)

Phalaris arundinacea L. Sp. Pl. 55. 1753.

Glabrous, culms erect, 2°–5° tall, simple, smooth. Sheaths shorter than the internodes; ligule 1″–3″ long, obtuse, membranous; leaves 3½′–10′ long, 3″–8″ wide, acuminate, smooth or scabrous; panicle 3′–8′ long, dense, its branches ½′–1½′ long, erect or sometimes slightly spreading; spikelets 2½″–3″ long; outer scales scabrous, 3-nerved; third and fourth scales less than one-half as long as the fifth, subulate, rigid, hairy; fifth scale about three-fourths as long as the spikelet, chartaceous, pubescent with long appressed silky hairs, subtending a palet of similar texture and a perfect flower.

In moist or wet soil, Nova Scotia to British Columbia, south to New Jersey, Kentucky, Kansas and Nevada. Also in Europe and Asia. July–Aug. The Ribbon-grass or Painted-grass of cultivation, the so-called variety *picta*, has leaves variegated with green and white stripes, is a derivative of this species, and sometimes escapes from gardens.

2. Phalaris Caroliniàna Walt. Carolina Canary-grass. (Fig. 291.)

Phalaris Caroliniana Walt. Fl. Car. 74. 1788.
Phalaris intermedia Bosc.; Poir. in Lam. Encycl. Suppl. 1: 300. 1810.
Phalaris Americana Ell. Bot. S. C. & Ga. 1: 101. 1817.

Culms 1°–3½° tall, erect or sometimes decumbent at base, simple or somewhat branched, smooth or roughish, glabrous. Sheaths usually shorter than the internodes; ligule 1″–3″ long, rounded, thin-membranous; leaves 2′–6′ long, 2″–5″ wide, smooth or slightly scabrous; spike-like panicle 1′–4′ long, dense, its branches about ½′ long, erect; spikelets 2½″ long, the outer scales more or less scabrous, 3-nerved, wing-keeled; third and fourth scales less than one-half as long as the fifth, subulate, hairy; fifth scale about two-thirds as long as the spikelet, acuminate, pubescent with long appressed silky hairs.

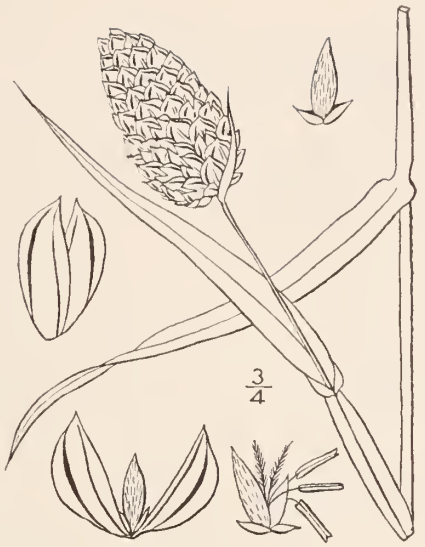
In moist soil, South Carolina to Missouri and California, south to Florida and Texas. June–Aug.

3. Phalaris Canariénsis L. Canary-grass. (Fig. 292.)

Phalaris Canariensis L. Sp. Pl. 54. 1753.

More or less roughened, culms 1°–3° tall, erect, simple or branched, glabrous. Sheaths shorter than the internodes; ligule about 1″ long, rounded; leaves 2′–12′ long, 2″–6″ wide, strongly scabrous; spikes ½′–1½′ long, ovoid or oblong; spikelets 3″–4″ long; outer scales glabrous or sparingly pubescent; third and fourth scales about half the length of the fifth, broadly lanceolate, thin-membranous, sparingly hairy; fifth scale about two-thirds as long as the spikelet, acute, pubescent with appressed silky hairs.

In waste places, Nova Scotia to Ontario, Virginia and Nebraska. Naturalized from Europe. Outer scales usually nearly white with green veins. The grain is the common food of canary birds. July–Aug.



19. ANTHOXÁNTHUM L. Sp. Pl. 28. 1753.

Fragrant annual or perennial grasses, with flat leaves and spike-like panicles. Spikelets 1-flowered, narrow, somewhat compressed. Scales 5; the two outer acute or produced into a short awn, the first shorter than the second; third and fourth scales much shorter, 2-lobed, awned on the back; the fifth scale shorter than the others, obtuse. Stamens 2. Styles distinct. Stigmas elongated, plumose. Grain free, enclosed in the scales. [Greek, referring to the yellow hue of the spikelets in some species.]

A genus of 4 or 5 species, natives of Europe.

1. Anthoxanthum odoràtum L. Sweet Vernal-grass. (Fig. 293.)

Anthoxanthum odoratum L. Sp. Pl. 28. 1753.

Culms 1°–2° tall, erect, simple or branched, smooth and glabrous. Sheaths shorter than the internodes; ligule 1″–2″ long, acute, membranous; leaves ½′–6′ long, 1″–3″ wide, glabrous or nearly so; spike-like panicles 1′–2½′ long, branches short, erect or ascending; spikelets 4″ long, crowded; outer scales acute, glabrous or pubescent, the first 1-nerved, half as long as the second which is 3-nerved; the third and fourth very hairy, the former with an awn nearly twice its length inserted about the middle, the fourth scale bearing near the base an awn more than twice its length; fifth scale about two-thirds as long as the fourth, obtuse or rounded at the apex, and bearing a fertile flower.

In fields and meadows throughout nearly the whole of North America. Very fragrant in drying. Naturalized from Europe. June–July.

20. SAVASTÀNA Schrank, Baier. Fl. 1: 100. 1789.

[Hierochloë J. G. Gmel. Fl. Sib. 1: 101. 1747.]

Aromatic perennial grasses, with flat leaves and contracted or open panicles. Spikelets 3-flowered, the terminal flower perfect, the others staminate. Scales 5; the first and second nearly equal, acute, glabrous; the third and fourth somewhat shorter, obtuse, entire, emarginate, 2-toothed or 2-lobed, with or without an awn, enclosing a palet and stamens; fifth scale often produced into a short awn, enclosing a palet and perfect flower. Stamens in the staminate flowers 3, in the perfect 2. Styles distinct. Stigmas plumose. Grain free, enclosed in the scales. [Name unexplained.]

About 8 species, natives of temperate and cold regions.

Third and fourth scales not awned,
Entire, culms 1°–2° tall. 1. *S. odorata.*
Erose-truncate, culms 6′ tall or less. 2. *S. pauciflora.*
Third and fourth scales awned. 3. *S. alpina.*

1. Savastana odoràta (L.) Scribn. Holy Grass. Seneca Grass. (Fig. 294.)

Holcus odoratus L. Sp. Pl. 1048. 1753.
Hierochloa borealis R. & S. Syst. 2: 513. 1817.
Savastana odorata Scribn. Mem. Torr. Club, 5: 34. 1894.

Glabrous, culms 1°–2° tall, erect, simple, smooth. Sheaths smooth; ligule 1″–2″ long; lower leaves elongated, 4′–8′ long, 1″–3″ wide, scabrous, the upper ones ½′–2′ long; panicle 2′–4′ long, its branches 1′–2′ long, usually spreading, naked below; spikelets yellowish-brown and purple, 2″–3″ long; first and second scales about equal, glabrous; third and fourth villous and strongly ciliate, entire, awn-pointed, the fifth smaller than the others, villous at the apex.

Newfoundland to Alaska, south to New Jersey, Wisconsin and Colorado. Also in northern Europe and Asia. June–July. This and other sweet-scented grasses are strewn before the churches in northern Europe, whence the name Holy Grass. Also known as Vanilla Grass.

2. Savastana pauciflòra (R. Br.) Scribn. Arctic Holy Grass. (Fig. 295.)

Hierochloa pauciflora R. Br. App. Parry's Voy. 293. 1824.
Savastana pauciflora Scribn. Mem. Torr. Bot. Club, 5: 353. 1894.

Glabrous, culms 6′ high or less, erect, simple, smooth. Sheaths mostly at the base of the culm, overlapping; ligule about ½″ long; leaves smooth, the basal ones 1′–2′ long, ½″ wide, involute at least when dry; culm leaves ½′ long or less, 1″ wide, flat; panicle less than 1′ long, contracted; spikelets few, 1½″–2″ long; first and second scales 1½″–2″ long, smooth and glabrous; third and fourth shorter, scabrous, erose-truncate, the fifth shorter than the others, obtuse, villous at the apex.

Arctic America. Summer.

3. Savastana alpìna (Sw.) Scribn. Alpine Holy Grass. (Fig. 296.)

Holcus alpinus Sw.; Willd. Sp. Pl. 4: 937. 1806.
Hierochloa alpina R. & S. Syst. 2: 515. 1817.
Savastana alpina Scribn. Mem. Torr. Club, 5: 34. 1894.

Glabrous and smooth, culms 6′–18′ tall, erect, simple. Sheaths shorter than the internodes; ligule less than 1″ long; lower leaves elongated, 3′–6′ long, about 1″ wide, the upper much shorter, ½′–2′ long, 1″–2″ wide; panicle ¾′–1½′ long, contracted, branches short, erect or ascending; occasionally the panicle is larger with longer and spreading branches; spikelets 2½″–3½″ long, crowded; first and second scales glabrous, 2½″–3½″ long; third and fourth shorter, scabrous, ciliate on the margins, the former bearing an awn about 1″ long, the latter with a more or less bent awn about 3″ long; fifth scale shorter than the others, acute, usually awn-pointed, villous at the apex.

Greenland to Alaska, south to the high mountains of New England and New York. Also in northern Europe and Asia. July–Aug.

21. ARÍSTIDA L. Sp. Pl. 82. 1753.

Grasses varying greatly in habit and inflorescence. Leaves narrow, often involute-setaceous. Spikelets narrow, 1-flowered. Scales 3, narrow, the two outer carinate ; the third ridged and convolute, bearing three awns occasionally united at the base, the lateral awns rarely wanting or reduced to rudiments. Palet 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, tightly enclosed in the scale. [Latin, from *arista*, an awn.]

About 100 species, in the warmer regions of both hemispheres. Besides the following, some 20 others occur in the southern and western parts of North America. The English name *Three-awned Grass* is applied to all the species.

Awns not articulated to the scale nor united at the base.

Lateral awns usually erect, not more than half as long as the horizontal or reflexed, central one, generally much shorter or occasionally wanting.

Third scale, exclusive of awns, 3″ long or less.

Central awn spiral at base, terminal straight portion 2″–3″ long. 1. *A. dichotoma.*

Central awn not spiral at base, terminal straight portion 3″–7″ long. 2. *A. gracilis.*

Third scale, exclusive of awns, 4″ long or more.

Central awn spiral, lateral awns one-quarter to one-half as long. 3. *A. basiramea.*

Central awn not spiral or rarely so, reflexed, lateral awns less than one-sixth as long or wanting. 4. *A. ramosissima.*

Lateral awns usually diverging, more than half as long as the horizontal or divergent central one, generally about equalling it.

First scale exceeding the second.

Sheaths glabrous. 5. *A. purpurascens.*

Sheaths, at least the lower ones, woolly. 6. *A. lanata.*

First scale half as long as the second or equalling it.

First scale 5-nerved, or occasionally 7-nerved at base. 7. *A. oligantha.*

First scale 1-nerved, sometimes with an obscure additional nerve on each side.

Central awn 1½′–4′ long; panicle 4′–6′ long, lax, few-flowered. 8. *A. purpurea.*

Central awn 1′ long or less.

Culms simple; panicle strict, 6′–2° long. 9. *A. stricta.*

Culms branched; panicle somewhat lax, not 1° long. 10. *A. dispersa.*

Awns articulated to the scale, more or less united at the base.

Column of the awns conspicuous, 3″ long or more. 11. *A. tuberculosa.*

Column of the awns inconspicuous, less than 1″ long. 12. *A. desmantha.*

1. Aristida dichótoma Michx. Poverty Grass. (Fig. 297.)

Aristida dichotoma Michx. Fl. Bor. Am. 1: 41. 1803.
Aristida dichotoma var. *Curtissii* A. Gray, Man. Ed. 6, 640. 1890.

Culms 6′–2° tall, erect, slender, dichotomously branched, smooth or roughened. Sheaths much shorter than the internodes, loose, smooth and glabrous; ligule very short, ciliate; leaves 1′–3′ long, less than 1″ wide, involute, acuminate, usually scabrous; spike-like racemes or panicles 2′–5′ long, slender; spikelets about 3″ long ; outer scales nearly equal or the lower somewhat shorter, usually awn-pointed ; third scale shorter than the second, the middle awn horizontal, coiled at base, the terminal straight portion 2″–3″ long, the lateral awns 1″ long or less, erect.

Dry sandy soil, Maine to Ontario, Missouri and the Indian Territory, south to Georgia and Texas. Aug.–Sept.

2. Aristida grácilis Ell. Slender Aristida. (Fig. 298.)

Aristida gracilis Ell. Bot. S. C. & Ga. 1: 142. 1817.
Aristida gracilis var. *depauperata* A. Gray, Man. Ed. 5, 618. 1867.

Glabrous and smooth throughout, culms 6′–2° tall, erect, simple or branched. Sheaths shorter than the internodes ; ligule very short ; leaves 1′–4′ long, 1″ wide or less, flat, or involute when dry ; panicle spike-like, 3′–7′ long, slender ; spikelets about 3″ long ; outer scales equal, or the lower somewhat shorter, awn-pointed ; third scale about equalling the second, generally mottled, middle awn horizontal, the terminal straight portion 3″–7″ in length, the lateral awns 1″–3″ long, erect.

Dry soil, Massachusetts to Illinois and Nebraska, south to Florida and Texas. Aug.–Sept.

3. Aristida basiràmea Engelm. Forked Aristida. (Fig. 299.)

Aristida basiramea Engelm.; Vasey, Coult. Bot. Gaz. 9: 76. 1884.

Glabrous and smooth, culms 6′–18′ tall, erect, slender, much branched. Sheaths shorter than the internodes, loose; ligule very short, ciliate; leaves 2′–6′ long, about 1″ wide, involute-setaceous; spike-like panicle 3′–5′ long; first scale of spikelet half to three-quarters as long as the second, which is 5″–7″ in length, both awn-pointed; third scale shorter than the second; middle awn 6″–9″ long, coiled at base, horizontal, lateral awns one-quarter to one-half as long, erect or divergent, somewhat spiral at the base.

In dry fields, Illinois to Manitoba, south to Virginia and Kansas. July-Sept.

4. Aristida ramosíssima Engelm. Branched Aristida. (Fig. 300.)

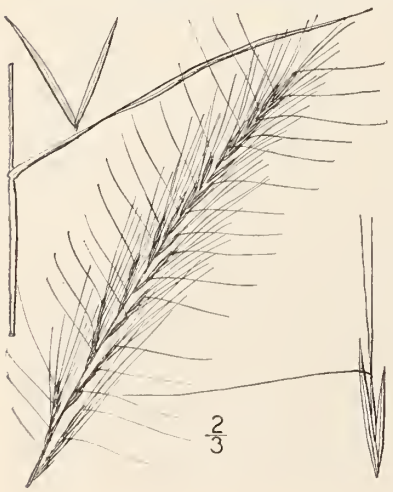
Aristida ramosissima Engelm.; A. Gray, Man. Ed. 5, 618. 1867.

Aristida ramosissima var. *uniaristata* A. Gray, Man. Ed. 5, 618. 1867.

Glabrous, culms 6′–2° tall, erect, slender, branched, smooth. Sheaths much shorter than the internodes, loose; ligule very short; leaves 1½′–3′ long, 1″ wide or less, flat, attenuate into a long point, smooth beneath, scabrous above; spikelets few, borne in loose spikes from 2′–4′ in length; first scale awn-pointed; second scale 8″–10″ in length, exceeding the first, terminated with an awn 1″–3″ long; third scale as long as the second; middle awn about 1′ long, horizontal or reflexed and forming a hook, the lateral awns erect, 1″–2″ long, rarely wanting.

In dry soil, Illinois to Kentucky and Missouri. July-Sept.

5. Aristida purpuráscens Poir. Purplish Aristida. (Fig. 301.)



Aristida purpurascens Poir. in Lam. Encycl. Suppl. 1: 452. 1810.

Glabrous and smooth, culms 1°–2½° tall, erect, simple or sparingly branched at the base. Sheaths longer than the internodes, crowded at the base of the culm; ligule very short; leaves 4′–8′ long, about 1″ wide, flat, or becoming involute in drying, attennate into a long point; spike-like panicles 5′–18′ long, strict, or sometimes nodding, its branches appressed; onter scales of spikelet awn-pointed, the first longer than the second; the third scale from two-thirds to three-qnarters as long as the first, middle awn 9″–12″ long, horizontal, the lateral awns somewhat shorter, erect or divergent.

In dry soil, Massachusetts to Minnesota, south to Florida, Kansas and Texas. Scales purplish. Sept.-Oct.

6. Aristida lanàta Poir. Woolly Aristida. (Fig. 302.)

Aristida lanata Poir. in Lam. Encycl. Suppl. 1: 453. 1810.
Aristida lanosa Muhl. Gram. 174. 1817.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths longer than the internodes, crowded at the base of the culm, woolly; ligule very short, minutely ciliate; leaves 1° long or more, about 2″ wide, attenuate into a long slender point, smooth beneath, scabrous above; panicle 1°–2° long, strict, branches erect or occasionally somewhat spreading; outer scales of the spikelet awn-pointed, the first 5″–7″ long, exceeding the second; third scale slightly shorter than the second, middle awn 8″–12″ long, usually horizontal, the lateral awns about two-thirds as long, erect or divergent.

Dry sandy soil, Delaware to Florida, west to Texas. Aug.–Sept.

7. Aristida oligántha Michx. Few-flowered Aristida. (Fig. 303.)

Aristida oligantha Michx. Fl. Bor. Am. 1: 41. 1803.

Glabrous, culms 1°–2° tall, erect, slender, dichotomously branched, smooth or roughish. Sheaths exceeding the internodes, loose; ligule very short, minutely ciliate; leaves 1′–6′ long, ½″–1″ wide, smooth, the larger ones attenuate into a long slender point; spikelets few, borne in a lax spike-like raceme or panicle; first scale 5-nerved, occasionally 7-nerved at base, acuminate or short-awned, equalling or somewhat shorter than the second, which bears an awn 2″–4″ long; third scale shorter than the first, awns divergent or spreading, the middle one 1½′–2½′ long, the lateral somewhat shorter.

Dry soil, New Jersey and Maryland to Nebraska, south to Louisiana and Texas. Aug.–Sept.

8. Aristida purpùrea Nutt. Purple Aristida. (Fig. 304.)

Aristida purpurea Nutt. Trans. Am. Phil. Soc. (II.) 5: 145. 1833–37.

Glabrous, culms 8′–18′ tall, erect, slender, simple, smooth or rough. Sheaths usually shorter than the internodes, smooth or slightly scabrous; ligule short, ciliate; leaves 1½′–4′ long, ½″ wide, involute, at least when dry, generally scabrous; spikelets few in spike-like racemes or panicles which are 4′–8′ in length; first scale one-nerved or sometimes with an obscure additional nerve on each side; second scale 7″–9″ long, about twice as long as the first; third scale equalling or a little exceeding the first, awns divergent, the middle one 1′–3½′ long, the lateral ones a little shorter or of the same length.

Dry soil, Minnesota to Idaho and British Columbia, south to Kansas, Texas and Arizona. Plant purple or purplish. July–Sept.

9. Aristida stricta Michx. Erect Aristida. (Fig. 305.)

Aristida stricta Michx. Fl. Bor. Am. 1: 41. 1803.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth, glabrous or pubescent at the apex; ligule short; leaves involute-filiform, the basal 1° or more in length, those of the culm 8′–12′ long, or the upper shorter; panicle spike-like, strict, or the top sometimes nodding, 6′–2° long, its branches erect; outer scales of the spikelet awn-pointed, the first 1-nerved or occasionally with an obscure additional nerve on each side, shorter than the second; third scale equalling the first or a little shorter; middle awn 5″–10″ long, horizontal when old, the lateral ones shorter, erect or divergent.

Dry soil, Virginia (according to S. Watson), south to Florida. July–Sept.

10. Aristida dispérsa Trin. & Rupr. Bushy Aristida. (Fig. 306.)

Aristida Americana L. Amoen. Acad. 5: 393. 1759?

Aristida fasciculata Torr. Ann. Lyc. N. Y. 1: 154. 1824?

Aristida dispersa Trin. & Rupr. Mem. Acad. St. Petersb. (VI.) 5: 129. 1842.

Glabrous, culms 1°–2° tall, erect, slender, branched, smooth, Sheaths shorter than the internodes, ligule short, ciliate; leaves 2′–6′ long, 1″ wide or less, flat, attenuate into a long point, smooth or scabrous; panicle 3′–7′ long, at first strict, the branches finally more or less spreading; first scale of spikelet 1-nerved, or occasionally with an obscure additional nerve on each side, shorter than the second scale; third scale equalling or longer than the second; awns divergent, the middle one 4″–8″ long, the lateral ones shorter.

Dry soil, Kansas to Texas, Mexico, New Mexico and California. Aug.–Sept.

11. Aristida tuberculòsa Nutt. Sea-beach Aristida. (Fig. 307.)

Aristida tuberculosa Nutt. Gen. 1: 57. 1818.

Glabrous, culms 6′–2° tall, erect, dichotomously branched, smooth. Sheaths shorter than the internodes; ligule short, ciliate; leaves 5′–9′ long, about 1″ wide, attenuate into a long slender point, smooth beneath, scabrous above; panicle 5′–8′ long, branches slender, ascending; outer scales of the spikelet about equal, awned, the third scale shorter; awns divergent or reflexed, more or less coiled, united at base into a column 3″–6″ long which is articulated to the scale.

Sandy soil, especially on sea-beaches, Massachusetts to Minnesota, south to Georgia. Also in the interior in Illinois, Wisconsin and Minnesota. Aug.–Sept.

12. Aristida desmántha Trin. & Rupr. Western Aristida. (Fig. 308.)

Aristida desmantha Trin. & Rupr. Mem. Acad. St. Petersb. (VI.) 5: 109. 1842.

Culms 1°–2° tall, erect, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, glabrous or the lower sometimes pubescent; ligule short; leaves 6′–12′ long, less than 1″ wide, attennate iuto a slender point, smooth beneath, scabrous above; panicle about 6′ long, the branches slender, ascending; outer scales of the spikelet about eqnal, the third one shorter; awns spreading or reflexed, somewhat coiled, nnited at base into a column less than 1″ long, which is articulated to the scale.

In dry soil, Kansas (?), the Indian Territory and Texas. Aug.–Sept.

22. STÌPA L. Sp. Pl. 78. 1753.

Generally tall grasses, the leaves usually convolute, rarely flat, the inflorescence paniculate. Spikelets 1-flowered, narrow. Scales 3; the two outer narrow, acnte or rarely bearing an awn, the third rigid, convolute, with a hairy callns at the base, and bearing a more or less bent awn, which is spiral at the base, and articulated to the scale. Palet 2-nerved. Stamens 3, rarely fewer. Styles short, distinct Stigmas plumose. Grain narrow, free, tightly enclosed in the scale. [Greek, in allusion to the tow-like plnmes of some species.]

A genus of about 100 species, distributed throughout the temperate and tropical zones. Besides the following, some 20 others occur in the southern and western parts of North America.

Outer scales of the spikelet 2″–6″ long:
- Obtuse or blunt-pointed, 2″ in length. — 1. *S. Macounii.*
- Acute, 4″–6″ in length.
  - Awn less than five times the length of the scale. — 2. *S. viridula.*
  - Awn more than seven times the length of the scale. — 3. *S. avenacea.*

Outer scales of the spikelet 10″ long or more.
- Base of panicle usually included in the upper sheath; third scale 4″–6″ long; awn slender, curled. — 4. *S. comata.*
- Panicle exserted from the upper sheath; third scale 7″–12″ long, bent. — 5. *S. spartea.*

1. Stipa Macoùnii Scribn. Macoun's Stipa. (Fig. 309.)

Stipa Richardsonii A. Gray, Man. Ed. 2, 249. 1856. Not Link, 1833.

Stipa Macounii Scribn.; Macoun, Cat. Can. Pl. 5: 390. 1890.

Culms glabrous, 1°–2° tall, erect, simple, slender, smooth or somewhat scabrous. Sheaths shorter than the internodes; ligule about 1″ long, obtuse or truncate; leaves 2′–5′ long, ½″–1″ wide, flat, becoming involute-setaceous in drying, scabrous; panicle 2′–5′ long, contracted, the branches 1′–2′ long, erect, naked below; spikelets borne at the ends of the branches; outer scales abont 2″ long, obtnse or blunt-pointed, glabrous; third scale somewhat shorter, pubescent with long appressed silky hairs, callus obtuse; awn 4″–5″ long, contorted.

New Brunswick to the Northwest Territory, south to Maine, New Hampshire, Lake Superior and Montana. July.

2. Stipa viridula Trin. Green Stipa. (Fig. 310.)

Stipa viridula Trin. Mém. Acad. St. Petersb. (VI.) 2: 39. 1836.
Stipa spartea Hook. Fl. Bor. Am. 2: 237. 1840. Not Trin.

Glabrous, culms 1½°–3° tall, erect, simple, smooth. Sheaths shorter than the internodes; ligule 1″–2″ long; leaves smooth or scabrous, the basal ones involute-filiform, one-third to one-half as long as the culm, those of the culm 3′–9′ long, broader; panicle spike-like, strict and erect, branches appressed; outer scales of spikelet 3″–4″ long, long-acuminate, glabrous; third scale shorter, more or less pubescent with long appressed silky hairs, callus acute; awn ¾′–1¼′ long, bent, loosely spiral at base.

Minnesota to British Columbia, south to Kansas, New Mexico and California. July–Aug.

3. Stipa avenàcea L. Black Oat-grass. (Fig. 311.)

Stipa avenacea L. Sp. Pl. 78. 1753.
Stipa barbata Michx. Fl. Bor. Am. 1: 53. 1803.
Stipa Virginica Pers. Syn. 1: 99. 1805.
Stipa bicolor Pursh, Fl. Am. Sept. 73. 1814.

Culms glabrous, 1°–2½° tall, erect or leaning, simple, smooth. Sheaths shorter than the internodes; ligule about 1″ long, obtuse; leaves involute-filiform, smooth beneath, scabrous above, the basal one-third to one-half the length of the culm, those of the culm 3′–5′ long; panicle 5′–8′ long, loose, the branches lax, erect or finally spreading, naked below; outer scales of the spikelet 4″–5″ long, acute, glabrous; third scale a little shorter, scabrous near the summit, black, pilose at base and with a ring of short hairs at the top, otherwise smooth and glabrous; callus hard, acute; awn 1½′–2½′ long, bent, loosely spiral below.

In dry woods, Rhode Island to Florida, mostly near the coast. Also in western Ontario and Wisconsin. May–June.

4. Stipa comàta Trin. & Rupr. Western Stipa. (Fig. 312.)

Stipa comata Trin. & Rupr. Mem. Acad. St. Petersb. (VI.) 5: 75. 1842.

Glabrous, culms 1°–2° tall, erect, simple, smooth. Sheaths usually longer than the internodes, smooth or scabrous, the uppermost very long and inflated, enclosing the base of the panicle; ligule 1″–2″ long, obtuse; leaves smooth or somewhat scabrous, the basal involute-filiform, one-quarter to one-half as long as the culm, the culm leaves 3′–6′ long, a little broader than the basal ones, involute; panicle 6′–9′ long, loose, the branches 3′–5′ in length, erect-ascending, naked at base; outer scales of the spikelet 9″–12″ long, glabrous, acuminate into an awn 2″–4″ in length; third scale 4″–6″ long, callus acute; awn 4′–8′ in length, slender, curled, spiral and pubescent below.

On prairies, Alberta to British Columbia, south to Nebraska, New Mexico and California. June–July.

5. Stipa spàrtea Trin. Porcupine Grass. (Fig. 313.)

Stipa spartea Trin. Mem. Acad. St. Petersb. (VI.) 1: 82. 1831.

Culms glabrous, 2°–4° tall, erect, simple, smooth. Sheaths longer than the internodes, smooth or somewhat scabrous; ligule 1″–2″ long, obtuse; leaves smooth beneath, scabrous above, the basal one-third to one-half as long as the culm, 1″ wide or less, usually involute, those of the culm 6′–12′ long, about 2″ wide, generally flat, attenuate into a long slender point; panicle finally long-exserted, 4′–10′ in length, its branches 3′–6′ long, erect, naked below; outer scales of spikelet 12″–18″ long, acuminate into a long slender point, glabrous; third scale 7″–12″ long, callus acute; awn 4′–8′ long, stout, usually twice bent, tightly spiral and pubescent below, doubly spiral about the middle.

On prairies, Manitoba to British Columbia, south to Illinois and Kansas. June–July.

23. ORYZÓPSIS Michx. Fl. Bor. Am. 1: 51. 1803.

[URACHNE Trin. Fund. Agrost. 109. 1818.]

Usually tufted grasses, with flat or convolute leaves and paniculate inflorescence. Spikelets 1-flowered, broad. Scales 3; the two lower about equal, obtuse or acuminate; the third scale shorter or a little longer, broad, bearing a terminal awn which is early deciduous, the callus at the base of the scale short and obtuse, or a mere scar. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, tightly enclosed in the convolute scale. [Greek, in allusion to the supposed resemblance of these grasses to rice.]

About 24 species, distributed through temperate and subtropical regions, rarely extending into the tropics. Besides the following, some 7 others occur in the western parts of North America.

Third scale of the spikelet glabrous or sparingly pubescent with short appressed hairs.
- Spikelet, exclusive of awn, 1¼″–2″ long.
  - Awn less than 1″ long, much shorter than the scale; outer scales 1½″–2″ in length. 1. *O. juncea.*
  - Awn 3″–4″ long, more than twice as long as the scale; outer scales about 1¼″ in length. 2. *O. micrantha.*
- Spikelet, exclusive of awn, 3″–4″ long.
  - Culms nearly naked, leaves all crowded at the base; panicle 2′–3′ long, its branches 1′ in length or less, erect. 3. *O. asperifolia.*
  - Culms leafy to the top; panicle 6′–12′ long; branches 2′–4′ in length, more or less spreading. 4. *O. melanocarpa.*

Third scale of the spikelet densely pubescent with long silky hairs. 5. *O. cuspidata.*

1. Oryzopsis júncea (Michx.) B.S.P. Slender Mountain Rice. (Fig. 314.)

Stipa juncea Michx. Fl. Bor. Am. 1: 54. 1803.
Oryzopsis Canadensis Torr. Fl. N. Y. 2: 433. 1843.
Oryzopsis juncea B. S. P. Prel. Cat. N. Y. 67. 1888.

Culms glabrous, 6′–2° tall, erect, slender, simple, smooth. Sheaths shorter than the internodes, usually crowded at the base of the culm; ligule about 1″ long, decurrent; leaves smooth or scabrous, erect, involute, the basal about one-half the length of the culm, occasionally equalling it, filiform, those of the culm 1′–4′ long, the uppermost often very small or reduced to the sheath only; panicle 1′–2½′ long, the branches ½′–1′ in length, erect or ascending, the lower half naked; spikelets 1½″–2″ long, the outer scales about equal, glabrous, whitish; third scale about the same length or a little longer, pubescent with short appressed silky hairs, the awn less than 1″ long.

In dry rocky places, Quebec to British Columbia, south to Massachusetts, Pennsylvania and Wisconsin. May–June.

2. Oryzopsis micrántha (Trin. & Rupr.) Thurb. Small-flowered Mountain Rice. (Fig. 315.)

Urachne micrantha Trin. & Rupr. Mem. Acad. St. Petersb. (VI.) 5: 16. 1842.
Oryzopsis micrantha Thurb. Proc. Phila. Acad. 1863: 78. 1863.

Culms glabrous, 1°–2½° tall, erect, slender, simple, smooth. Sheaths shorter than the internodes; ligule about ½″ long, truncate; leaves erect, scabrous, the basal one-half the length of the culm, less than ½″ wide, usually more or less involute, the culm leaves 2′–8′ long, ½″–1″ broad, the larger attenuate into a long slender point; panicle 3′–6′ long, the branches finally spreading, the lower ones 1′–2′ long, naked for about two-thirds their length; spikelets 1″–1¼″ long, the outer scales about equal, acute, glabrous; third scale shorter, glabrous, bearing an awn 3″–4″ long.

South Dakota to Nebraska, New Mexico and Arizona. June–July.

3. Oryzopsis asperifòlia Michx. White-grained Mountain Rice. (Fig. 316.)

Oryzopsis asperifolia Michx. Fl. Bor. Am. 1: 51. 1803.
Urachne asperifolia Trin. Unifl. 1: 174. 1824.

Culms glabrous, 10′–20′ tall, erect, simple, smooth or scabrous. Sheaths 1′–2′ long, crowded at base; ligule very short, truncate; leaves erect, scabrous, especially above, the basal ones elongated, often equalling or exceeding the culm, 2″–4″ wide, attenuate into a long point, the 1 or 2 culm leaves much reduced, less than ½′ long; panicle 2′–3′ long, contracted, the branches 1′ in length or less, erect; spikelet, exclusive of awn, 3″–4″ long; outer scales glabrous, usually apiculate, the first somewhat shorter; third scale whitish, equalling the second or a little shorter, sparingly pubescent, the awn 3½″–5″ long.

In woods, Nova Scotia to British Columbia, south to New Jersey, Pennsylvania, Minnesota and in the Rocky Mountains to New Mexico. May–June.

4. Oryzopsis melanocàrpa Muhl. Black-fruited Mountain Rice. (Fig. 317.)

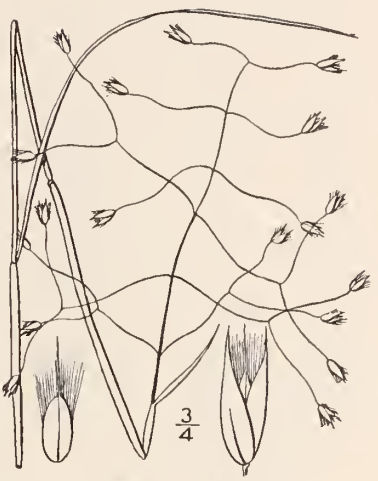
Oryzopsis melanocarpa Muhl. Gram. 79. 1817.
Urachne racemosa Trin. Unifl. 1: 174. 1824.

Glabrous, culms 1½°–3° tall, erect, simple, roughish. Sheaths smooth or scabrous, the lower ones usually longer, the upper slightly shorter than the internodes; ligule very short; leaves 5′–12′ long, 2″–7″ wide, narrowed toward the base, acuminate at apex into a long slender point, scabrous especially above; panicle branched or nearly simple, 3′–12′ long, its branches 2′–4′ long, spreading or ascending, the lower half naked; outer scales of the spikelet about equal, 3″–4″ in length, acute; third scale shorter, acute, dark colored, sparingly pubescent, the awn 8″–12″ long.

Rocky woods, Vermont and Ontario to Minnesota, south to New Jersey, Kentucky and Missouri. July–Aug.

5. Oryzopsis cuspidàta (Nutt.) Vasey. Silky Oryzopsis. (Fig. 318.)

Stipa membranacea Pursh, Fl. Am. Sept. 728. 1814. Not L. 1753.
Eriocoma cuspidata Nutt. Gen. 1: 40. 1818.
Oryzopsis cuspidata Benth.; Vasey, Special Rep. U. S. Dept. Agric. 63: 23. 1883.
Oryzopsis membranacea Vasey, Grasses S. W. Part 2, *pl. 10.* 1891.



Culms glabrous, 1°–2° tall, erect, rigid, simple, smooth. Sheaths usually shorter than the internodes, smooth or somewhat rough; ligule 1″–2″ long, acute; leaves 6′–12′ long, less than 1″ wide, involute, stiff, smooth or somewhat scabrous; panicle 6′–1° long, diffuse, generally partially included in the upper sheath, its branches widely spreading and many times forked, the ultimate divisions flexuous; outer scales of the spikelet 3″-4″ in length, long-acuminate, glabrous; third scale about one-half as long, acute, densely pubescent with long silky erect hairs nearly twice its own length, the awn 2″–3″ long.

On prairies, Alberta to Washington, south to Nebraska, Arizona and Mexico. May–July.

24. MÍLIUM L. Sp. Pl. 61. 1753.

Annual or perennial grasses, with flat leaves and terminal lax panicles. Spikelets 1-flowered. Scales 3, obtuse, not awned; the outer about equal; the third thin-membranous, at length rigid, glabrous or pubescent; palet scarcely shorter. Stamens 3. Styles short, distinct. Stigmas plumose. Grain ovoid or oblong, free, tightly enclosed in the rigid and shining scale and palet. [Latin name for Millet.]

Species 5 or 6, chiefly in Europe and Asia.

1. Milium effùsum L. Tall Millet-grass. (Fig. 319.)

Milium effusum L. Sp. Pl. 61. 1753.

Glabrous throughout, culms 2°–6° tall, erect, simple, smooth, Sheaths shorter than the internodes; ligule 1½″–3″ long, truncate, erose-dentate; leaves 3′–9′ long, 3″–8″ wide, narrowed toward the base, acuminate, smooth or scabrous; panicle 3′–10′ in length, lax, its branches 2′–3′ long, slender, somewhat flexuous, naked at base and dividing above the middle, at length widely spreading; spikelets 1¼″–1½″ long; outer scales equal, smooth or scabrous, the third scale shorter, smooth, white.

In woods, Cape Breton Island and Quebec to western Ontario, south to Massachusetts, Pennsylvania and Michigan. Also in northern Europe and Asia. June–July.

25. MUHLENBÉRGIA Schreb. Gen. 44. 1789.

[VASEYA Thurb. Proc. Acad. Phila. 1863: 79. 1863.]

Mostly perennial grasses, with flat or convolute leaves and paniculate inflorescence. Rootstocks often scaly. Spikelets 1-flowered, very rarely 2 flowered. Scales 3, very rarely 4; the outer ones empty, membranous or hyaline, acute and sometimes awned; third scale 3–5-nerved, subtending a palet and perfect flower, obtuse, acute, or very often produced into a capillary awn; palet 2-keeled. Stamens often 3. Styles distinct. Stigmas plumose. Callus minute. Grain narrow, free, tightly enclosed in the scale. [In honor of Henry Muhlenberg, 1756–1817, North American botanist.]

About 60 species, chiefly natives of America, a few Asiatic.

Panicle contracted, narrow, spike-like, the short branches rarely spreading.
- Flowering scale not awned but sometimes awn-pointed.
  - Outer scales not awned, about half as long as the flowering scale, acute. 1. *M. sobolifera.*
  - Outer scales long-acuminate, awn-pointed or awned.
    - Outer scales about equal in length to the flowering scale, sharp-pointed, about 1½″ long. 2. *M. Mexicana.*
    - Outer scales exceeding the flowering scale, generally twice its length, awned, about 2½″ long. 3. *M. racemosa.*
- Flowering scale long-awned; awn usually twice the length of the scale, sometimes shorter.
  - Outer scales about equalling the flowering scale.
    - Basal hairs not more than one-half the length of the flowering scale.
      - Spikelets consisting of 3 scales and 1 perfect flower. 4. *M. sylvatica.*
      - Spikelets consisting of 4 scales, the third with a perfect flower, the fourth empty and awned, 5. *M. ambigua.*
    - Basal hairs as long as the flowering scale. 6. *M. comata.*
  - Outer scales one-half to two-thirds as long as the flowering scale. 7. *M. tenuiflora.*
  - Outer scales less than one-quarter the length of the flowering scale.
    - Lower scale minute, often wanting; flowering scale with an awn twice its length. 8. *M. diffusa.*
    - Lower scale about two-thirds as long as the second; flowering scale with an awn four times its length or more. 9. *M. microsperma.*

Panicle open, its branches long and spreading.
- Culms 1½° tall or more; panicle diffuse; leaves elongated, not rigid. 10. *M. capillaris.*
- Culms 1° tall or less; leaves 2′ long or less, rigid.
  - Secondary branches of the panicle single; basal leaves short, numerous, strongly recurved. 11. *M. gracillima.*
  - Secondary branches of the panicle fascicled; basal leaves few, not recurved. 12. *M. pungens.*

1. Muhlenbergia sobolifera (Muhl.) Trin. Rock Muhlenbergia. (Fig. 320.)

Agrostis sobolifera Muhl.; Willd. Enum. 95. 1809.
Muhlenbergia sobolifera Trin. Unifl. 189. 1824.

Glabrous, culms 2°–3° tall, erect, slender, simple, or sparingly branched above, smooth. Sheaths smooth, those of the culm shorter than the internodes, those of the branches overlapping and crowded; ligule very short, truncate; leaves rough, those of the culm 4′–6′ long, 1½″–3″ wide, those of the branches 1′–3′ long, about 1″ wide; panicle 3′–6′ in length, slender, its branches ¾′–1′ long; outer scales about ½″ long, half to two-thirds the length of the spikelet, equal, or the lower somewhat shorter, acute, scabrous, especially on the keel; third scale scabrous, obtuse, 3-nerved, the middle nerve usually excurrent as a short point.

Rocky woods, Massachusetts to Minnesota, south to Virginia, Tennessee and the Indian Territory. Sept.–Oct.

2. Muhlenbergia Mexicàna (L.) Trin. Meadow Muhlenbergia. (Fig. 321.)

Agrostis Mexicana L. Mant. 1: 31. 1767.
Agrostis filiformis Willd. Enum. 95. 1809.
Muhlenbergia Mexicana Trin. Unifl. 189. 1824.

Glabrous, culms 2°–4° long, erect, or often prostrate, much branched, smooth. Sheaths shorter than the internodes, excepting at the extremities of the branches, where they are crowded and overlapping, smooth or scabrous; leaves scabrous, those of the culm 4′–6′ long, 1″–3″ wide, the branch leaves smaller; panicle 2′–6′ long, contracted, its branches spike-like, 1′–2′ long, erect or appressed; spikelets 1¼″–1½″ long; outer scales somewhat unequal, exceeding the flowering one, or slightly shorter, acuminate or short-awned, scabrous especially on the keel; third scale acuminate, scabrous, particularly toward the apex.

In swamps and borders of fields, New Brunswick to western Ontario, south to North Carolina, Tennessee and the Indian Territory. Aug.–Sept.

3. Muhlenbergia racemòsa (Michx.) B.S.P. Marsh Muhlenbergia. (Fig. 322.)

Agrostis racemosa Michx. Fl. Bor. Am. 1: 53. 1803.
Muhlenbergia glomerata Trin. Unifl. 191. 1824.
Muhlenbergia racemosa B.S.P. Prel. Cat. N. Y. 67. 1888.

Culms 1°–3° tall, erect, usually much branched, smooth and glabrous. Sheath smooth, those of the culm shorter than the internodes, those of the branches overlapping and often crowded; ligule about ½″ long, erose-truncate; leaves 2′–5′ long, 1″–3″ wide, scabrous; panicle 2′–4½′ in length, usually dense and interrupted, the branches ½′–1′ long, erect or appressed, the spikelets much crowded; outer scales of the spikelet acuminate, 2″–3″ long, including the awn, smooth or scabrous, especially on the keel; third scale one-half to two-thirds as long, acuminate, the strongly scabrous midrib excurrent in a short point.

In wet places, Newfoundland to British Columbia, south to New Jersey, Missouri and New Mexico. Aug.–Sept.

4. Muhlenbergia sylvática Torr. Wood Muhlenbergia. (Fig. 323.)

Agrostis diffusa Muhl. Gram. 64. 1817. Not Host, 1809.
Muhlenbergia sylvatica Torr. Fl. U. S. 1: 87. 1824.

Culms 1°–3° tall, erect, branched, smooth or somewhat scabrous. Sheaths smooth or slightly scabrous, those of the culm shorter than the internodes, those of the branches overlapping and often crowded; ligule about ½″ long, erose-truncate; leaves 2′–7′ long, 1″–3″ wide, rough; panicle 3′–7′ in length, somewhat lax, the branches 1′–3′ long, erect or ascending; outer scales of the spikelet 1¼″–1½″ long, awn-pointed, scabrous; third scale equalling or somewhat exceeding the outer ones, strongly scabrous, attenuate into a slender awn 2–4 times its length.

In moist woods and along streams, New Brunswick to Ontario and Minnesota, south to North Carolina, Tennessee and the Indian Territory. Aug.–Sept.

5. Muhlenbergia ambígua Torr. Minnesota Muhlenbergia. (Fig. 324.)

Muhlenbergia ambigua Torr. Nicollet's Rep. 164. 1843.

Glabrous, culms 1° tall or lower, erect, branched, smooth. Sheaths shorter than the internodes; ligule about ½″ long, erose-truncate; leaves 1′–3′ long, 1″–2″ wide, scabrous; panicle 1′–3′ long, rigid, its branches ½′–1′ long, dense, appressed; outer scales of the spikelet awn-pointed, unequal, the longer about 2″ in length and exceeding the body of the third scale which is scabrous, villous, and attenuate into an awn 2–3 times its length; a fourth narrow awned scale is nearly always present.

Along a lake shore in Minnesota.

6. Muhlenbergia comàta (Thurb.) Benth. Hairy Muhlenbergia. (Fig. 325.)

Vaseya comata Thurb. Proc. Phila. Acad. 1863: 79. 1863.

Muhlenbergia comata Benth.; Vasey, Cat. Grasses U. S. 39. 1885.

Culms 1°–2½° tall, erect, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous; ligule about ½″ long, truncate, naked or minutely ciliate; leaves 2½′–5′ long, 1″–2″ wide, erect, flat, rough; panicle often tinged with purple, 2′–4′ in length, dense, branches ½′–1½′ long, erect; outer scales of the spikelet equal, or the second a little the longer, smooth, scabrous on the keel; third scale shorter, smooth and glabrous, bearing an awn 2–3 times its length, the basal hairs silky, erect, fully as long as the scale.

On prairies; Kansas (?), Colorado to California. Aug.–Sept.

7. Muhlenbergia tenuiflòra (Willd.) B.S.P. Slender Muhlenbergia. (Fig. 326.)

Agrostis tenuiflora Willd. Sp. Pl. 1: 364. 1798.
Agrostis pauciflora Pursh, Fl. Am. Sept. 1: 63. 1814.
Muhlenbergia Willdenovii Trin. Unifl. 188. 1824.
Muhlenbergia tenuiflora B.S.P. Prel. Cat. N. Y. 67. 1888.

Glabrous, culms 2°–3° tall, erect, slender, simple or sparingly branched, smooth. Sheaths usually shorter than the internodes; ligule short and truncate; leaves 2½′–7′ long, 1″–4″ wide, narrowed toward the base, acuminate, scabrous; panicle 5′–9′ long, slender, its branches 1′–3½′ long, appressed; outer scales of the spikelet unequal, half to two-thirds the length of the third one, awn-pointed, scabrous; third scale 1¼″–1½″ long, scabrous, bearing an awn 2–4 times its length.

In rocky woods, Massachusetts to southern Ontario and Minnesota, south to Alabama and Texas. Aug.–Sept.

8. Muhlenbergia diffùsa Schreb. Nimble Will. Dropseed Grass. (Fig. 327.)

Muhlenbergia diffusa Schreb. Beschr. Gras. 2: 143. *pl. 51.* 1772–9.

Glabrous, culms 1°–3° long, decumbent, or often prostrate or creeping and ascending, very slender, diffusely branched. Sheaths shorter than the internodes, loose; ligule short, fringed; leaves 1½′–3½′ long, ½″–2″ wide, scabrous; panicle 2′–8′ long, slender somewhat lax, its branches 1′–2′ long, erect; outer scales of the spikelet minute, the lower one often wanting; the third scale, exclusive of the awn, about 1″ long, strongly scabrous, particularly upon the nerves; the awn ½″–2″ in length.

On dry hills and in woods, Maine and southern Ontario to Minnesota, south to Florida, Kansas and Texas. Aug.–Sept.

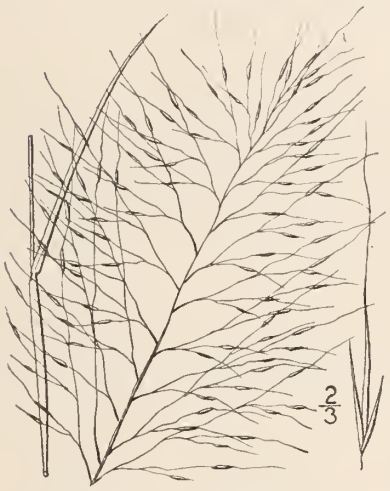
9. Muhlenbergia microspérma (DC.) Trin. Small-seeded Muhlenbergia. (Fig. 328.)

Trichochloa microsperma DC. Cat. Hort. Monsp. 151. 1813.
Muhlenbergia microsperma Trin. Unifl. 193. 1824.
Muhlenbergia debilis Trin. Mem. Acad. St. Petersb. (VI.) 6: 295. 1841.

Culms 6′–1½° tall, erect, finally decumbent or somewhat prostrate at base, slender, diffusely branched. Sheaths usually shorter than the internodes, loose; ligule ½″ long, truncate, toothed; leaves ½′–2½′ long, 1″ wide or less, scabrous; panicle 2′–4′ in length, slender, open, the branches 1′ long or less, ascending or erect; outer scales of the spikelet unequal, obtuse or rounded at apex, about one-third the length of the third scale, which is 1¼″–1½″ long exclusive of the awn and strongly scabrous; awn 6″–12″ in length.

In dry soil, Kansas to California, south to Mexico.

10. Muhlenbergia capillàris (Lam.) Trin. Long-awned Hair-grass. (Fig. 329.)



Stipa capillaris Lam. Tabl. Encycl. 1: 158. 1791.
Muhlenbergia capillaris Trin. Unifl. 191. 1824.

Glabrous, culms 1½°–4° tall, erect, simple, smooth or nearly so. Sheaths smooth, the lower short and overlapping, the upper ones much longer; ligule about 2″ in length; leaves 6′–1° long, 1″–2″ wide, scabrous; panicle 7′–1° in length or more, diffuse, the capillary branches 4′–8′ long, at length widely spreading; spikelets on long hair-like pedicels which are clavate-thickened at the apex; outer scales unequal, acute or short-awned, slightly scabrous; third scale, exclusive of the awn, 2″ long, about twice as long as the first one, scabrous, the awn 3″–9″ in length.

In dry sandy or rocky soil, Massachusetts to New Jersey and Missouri, south to Florida and Texas. Panicle usually light purple. Sept.–Oct.

11. Muhlenbergia gracíllima Torr. Filiform Muhlenbergia. (Fig. 330.)

Muhlenbergia gracillima Torr. Pac. R. R. Rept. 4: 155. 1875.

Glabrous, culms 4′–14′ tall, from a slender creeping rootstock, erect, slender, simple, rigid. Sheaths smooth; ligule 1″–2″ long, entire and acuminate, or variously cleft, with acuminate teeth; leaves 1′–2′ long, involute-setaceous, smooth or somewhat scabrous, rigid, the basal numerous, usually strongly recurved, the 1–3 culm leaves erect or ascending; panicle 2′–9′ in length, open, the branches finally widely spreading, 1′–3′ long, filiform; spikelets about as long as the filiform pedicels which are clavate-thickened at the apex; outer scales unequal, usually awn-pointed or short-awned, slightly scabrous; third scale 1¼″–1½″ long, longer than the outer ones, sometimes twice as long, scabrous; awn 1″–2″ long.

On prairies, Kansas to Colorado, south to Texas and New Mexico. Sept.-Oct.

12. Muhlenbergia púngens Thurb. Prairie Muhlenbergia. (Fig. 331.)

Muhlenbergia pungens Thurb. Proc. Acad. Phila. 1863: 78. 1863.

Culms 6′–15′ tall from a creeping rootstock, erect from a decumbent branching base, rigid, minutely pubescent. Sheaths overlapping, crowded at the base of the culm, scabrous; ligule a ring of soft silky hairs; leaves 1′–2′ long, involute-setaceous, rigid, scabrous; panicle 3′–6′ in length, open, the branches 2′–2½′ long, single, distant, much divided from near the base, the divisions apparently fascicled; spikelets on long pedicels, which are clavate-thickened at the apex; outer scales, when mature, equalling or often shorter than the body of the third one, scabrous, especially on the keel; third scale, when mature, ¾″–1″ long, scabrous, the awn shorter than its body.

On prairies, Nebraska to Utah, south to Texas and Arizona. Aug.–Sept.

26. BRACHYÉLYTRUM Beauv. Agrost. 39. 1812.

A tall grass with flat leaves and a narrow panicle. Spikelets 1-flowered, narrow, the rachilla produced beyond the flower and sometimes bearing a minute scale at the summit. Scales 3; the outer small and inconspicuous, the lower often wanting; the third much longer, rigid, 5-nerved, acuminate into a long awn; palet scarcely shorter, rigid, sulcate on the back, 2-nerved Stamens 2. Styles short, distinct. Stigmas plumose, elongated. Grain oblong, free, enclosed in the scale and palet. [Greek, in allusion to the minute outer scales.]

A monotypic genus of eastern North America.

1. Brachyelytrum eréctum (Schreb.) Beauv. Brachyelytrum. (Fig. 332.)

Muhlenbergia erecta Schreb. Besch. Gras. 2: 139. *pl.* 50. 1772–9.
Brachyelytrum erectum Beauv. Agrost. 39. 1812.
Brachyelytrum aristatum R. & S. Syst. 2: 413. 1817.
Brachyelytrum aristatum var. *Engelmanni* A. Gray, Man. Ed. 5, 614. 1867.

Culms 1°–3° tall, erect, slender, simple, smooth or rough, pubescent at and near the nodes. Sheaths shorter than the internodes, scabrous toward the apex, more or less villous especially at the throat; ligule about ¾″ long, irregularly truncate; leaves 2′–5′ long, 3″–9″ wide, acuminate at both ends, scabrous; panicle 2′–6′ in length, slender, branches 1′–3′ long, erect or appressed; outer scales of the spikelet unequal, the upper less than one-third as long as the flowering scale, the lower minute or wanting; third scale, exclusive of the the awn, 4½″–6″ long, 5-nerved, scabrous, especially on the midnerve, the awn erect, 9″–12″ long; rachilla produced beyond the flower about half the length of the third scale and lying in the groove of the palet.

Moist places, Newfoundland to western Ontario and Minnesota, south to North Carolina, Tennessee and Missouri. Ascends to 5000 ft. in North Carolina. July–Aug.

27. HELEÓCHLOA Host, Gram. 1: 23. *pl. 29, 30.* 1801.

[Crypsis Lam. Tabl. Encycl. 1: 166. 1791. Not Ait. 1789.]

Perennial tufted grasses with flat leaves and spicate or paniculate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, somewhat unequal, membranous, acute, ciliate-keeled; the third scale similar, a little longer; palet shorter, hyaline, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, loosely enclosed in the scale. [Greek, signifying meadow-grass.]

About 8 species, chiefly natives of the Mediterranean region, one or two also widely distributed through middle Europe and Asia.

1. Heleochloa schoenoìdes (L.) Host. Rush Cat's-tail Grass. (Fig. 333.)

Phleum schoenoides L. Sp. Pl. 60. 1753.
Crypsis schoenoides Lam. Tabl. Encyl. 1: 166. *pl. 42.* 1791.
Heleochloa schoenoides Host, Gram. 1: 23. *pl. 30.* 1801.

Glabrous, culms 4′–18′ tall, erect or sometimes decumbent at the base, branched, smooth. Sheaths about half the length of the internodes, the upper loose, the one immediately below the spike inflated and usually partially enclosing it; ligule a ring of short hairs; leaves 1′–3′ long, 1″–2″ wide, flat, acuminate, smooth beneath, scabrous above; spikelets 1¼″ long, the empty scales acute, compressed, ciliate-keeled, 1-nerved, the lower shorter than the upper; third scale equalling or longer than the second, acute, compressed, ciliate-keeled, otherwise glabrous, 1-nerved; palet shorter, obtuse.

In waste places, southern New York to Delaware. Naturalized from Europe. July–Aug.

28. PHLÈUM L. Sp. Pl. 59. 1753.

Annual or perennial grasses with flat leaves and spicate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, membranous, compressed, keeled, the apex obliquely truncate, the midnerve produced into an awn; the third scale much shorter, broader, hyaline, truncate, denticulate at the summit; palet narrow, hyaline. Stamens 3. Styles distinct, somewhat elongated. Stigmas plumose. Grain ovoid, free, enclosed in the scale and palet. [Name Greek, taken from Pliny; originally applied to some very different plant.]

About 10 species, inhabiting the temperate zones of both hemispheres. The following only are natives of North America. The English name *Cat's-tail Grass* is applied to all the species.

Spikes usually elongated, cylindric; awns less than one-half the length of the outer scales; upper sheath not inflated. 1. *P. pratense.*
Spikes not elongated, ovoid to oblong and cylindric; awns about one-half the length of the outer scales; upper sheath inflated. 2. *P. alpinum.*

1. Phleum praténse L. Timothy. Herd's Grass. (Fig. 334.)

Phleum pratense L. Sp. Pl. 59. 1753.

Glabrous and smooth or very nearly so throughout, culms 1°–4° tall, erect, simple. Sheaths usually exceeding the internodes, sometimes shorter, the upper one long and not inflated, or very slightly so; ligule 1″–2″ long, rounded; leaves 3′–9′ long, 2″–3″ wide, smooth or scabrous; spike usually elongated, cylindric, 1½′–7′ in length, 2½″–4″ in diameter; outer scales of the spikelet, exclusive of the awn, 1¼″ long, ciliate on the keel, the awn less than half their length.

In fields and meadows nearly throughout North America. Also in Europe and Asia. Widely cultivated for hay. The scales are sometimes modified into small leaves. July–Aug.

2. Phleum alpìnum L. Mountain Phleum. (Fig. 335.)

Phleum alpinum L. Sp. Pl. 59. 1753.

Glabrous, culms 6′–18′ tall, erect or sometimes decumbent at the base, simple, smooth. Sheaths often much shorter than the internodes, sometimes longer, the upper one usually much inflated; ligule about 1″ long, truncate; leaves smooth beneath, scabrous above, the lower 2′–3′ long, 1″–4″ wide; upper leaf generally very short, less than 1′ long; spike short, ovoid to oblong and cylindric, ½′–2′ in length, 3″–6″ in diameter; outer scales of the spikelet, exclusive of the awn, 1½″ long, strongly ciliate on the keel, the awn about one-half their length.

Labrador to Alaska, south to the mountains of New Hampshire, Vermont, Arizona and California. Also in northern Europe and Asia and in Patagonia. Summer.

29. ALOPECÙRUS L. Sp. Pl. 60. 1753.

Annual or perennial grasses with erect or decumbent culms, usually flat leaves, and spicate inflorescence. Spikelets 1-flowered, flattened; scales 3, the 2 lower empty, acute, sometimes short-awned, more or less united below, compressed-keeled; keel ciliate or somewhat winged; third scale truncate or obtuse, hyaline, 3-nerved, awned on the back, subtending a perfect flower and usually a palet; palet hyaline, acute, sometimes wanting. Stamens 3. Styles distinct or rarely united at the base. Stigmas elongated, hairy. [Greek, signifying Fox-tail Grass, in allusion to the spikes.]

About 20 species, principally natives of the north temperate zone. Besides the following, some 4 others occur in western North America.

Outer scales of the spikelet united for one-half their length, smooth to hispid on the keel. 1. *A. agrestis.*

Outer scales of the spikelet united for one-quarter their length or less, long-ciliate on the keel.

Scales 1″–1¼″ in length. 2. *A. geniculatus.*

Scales 2″–3″ in length.

Spike 1½′–2½′ long; outer scales glabrous or sparingly pubescent on the lateral nerves. 3. *A. pratensis.*

Spike 1½′ long or less; outer scales villous. 4. *A. alpinus.*

1. Alopecurus agréstis L. Slender Foxtail. (Fig. 336.)

Alopecurus agrestis L. Sp. Pl. Ed. 2, 89. 1762.

Smooth or slightly scabrous, culms 1°–2° tall, erect, simple. Sheaths shorter than the internodes; ligule 1″ long, truncate; leaves 1½′–7′ long, 1″–3″ wide, scabrous, especially above; spike 1½′–4′ long, 2″–4″ thick; outer scales of the spikelet united at the base for about half their length, narrowly wing-keeled, 2″–2½″ long, the nerves smooth or scabrous, sometimes hispid below, especially on the keel; third scale equalling or slightly exceeding the outer ones, smooth and glabrous, the awn inserted near the base, about twice its length, bent.

In waste places and ballast, southern New York and New Jersey. Adventive from Europe. Native also of Asia. July–Aug.

2. Alopecurus geniculàtus L. Marsh Foxtail. (Fig. 337.)

Alopecurus geniculatus L. Sp. Pl. 60. 1753.
Alopecurus fulvus J. E. Smith, Engl. Bot. *pl. 1167.* 1805.
Alopecurus aristulatus Michx. Fl. Bor. Am. 1: 43. 1803.
Alopecurus geniculatus var. *aristulatus* Torr. Fl. U. S. 1: 97. 1824.

Glabrous or very nearly so, culms 6′–18′ tall, erect, or sometimes decumbent at the base, simple or sparingly branched, smooth. Sheaths usually shorter than the internodes, loose or somewhat inflated; ligule 1½″–3″ long; leaves 1′–6′ long, ½″–2″ wide, scabrous, especially above; spikes 1′–3′ in length, 2″–4″ thick; outer scales of the spikelet slightly united at the base, 1″–1¼″ long, obtuse or subacute, smooth, glabrous except on the pubescent lateral nerves and strongly ciliate keel; third scale somewhat shorter, obtuse, smooth and glabrous, the awn inserted at or below the middle, equalling or exceeding it.

In wet soil, Newfoundland to British Columbia, south to Florida, Tennessee, Arizona and California. Also in Europe and Asia. July–Sept.

3. Alopecurus praténsis L. Meadow Foxtail. (Fig. 338.)

Alopecurus pratensis L. Sp. Pl. 60. 1753.

Nearly or quite glabrous, slender, culms 1°–2½° tall, erect, simple. Sheaths usually much shorter than the internodes, loose or somewhat inflated; ligule about ½″ long, erose-truncate; leaves 1½′–3½′ long, 1″–3″ wide, scabrous, at least above; spikes 1½′–2½′ in length, 4″–6″ thick; outer scales of the spikelet united at the base for about one-quarter their length, 2″–3″ long, acute, glabrous except the sparingly pubescent lateral nerves and the strongly ciliate keel; third scale slightly shorter, obtuse, smooth and glabrous, the awn inserted about quarter way up the scale and exceeding it.

In meadows, Nova Scotia to southern New York and Ohio. Naturalized from Europe. June–July.

4. Alopecurus alpìnus J. E. Smith. Alpine Foxtail. (Fig. 339.)

Alopecurus alpinus J. E. Smith, Engl. Bot. *pl. 1126.* 1803.

Culms glabrous and smooth or nearly so, 5′–2° tall, erect, sometimes decumbent at the base, simple. Sheaths generally shorter than the internodes, loose, often inflated; ligule 1″–2″ long, rounded at the apex; leaves 1′–7′ long, 1″–3″ wide, smooth beneath, slightly scabrous above; spike 1½′ in length or less, 3″–6″ thick; outer scales of the spikelet united only at the base, 2″ long, obtuse, villous and ciliate; third scale about equalling the outer ones, obtuse, glabrous except at the villous apex, the awn inserted about one-third the way up, a little exceeding the scale.

Greenland and Labrador to Alaska. Also in arctic and alpine Europe and Asia. Summer.

30. PHÍPPSIA R. Br. Suppl. App. Parry's Voy. 275. 1824.

A low annual tufted grass, with flat leaves and spike-like panicles. Spikelets 1-flowered; scales 3; the 2 outer empty, minute, the first often wanting; the third scale thin-membranous, keeled. Palet somewhat shorter, 2-keeled. Stamen 1, rarely 2 or 3. Styles short, distinct. Stigmas plumose. Grain oblong, enclosed in the scale and palet, which readily split and allow it to drop out. [In honor of John Constantine Phipps, 1744–1792, Arctic navigator.]

A monotypic genus of the arctic regions.

1. Phippsia álgida (Soland.) R. Br. Phippsia. (Fig. 340.)

Agrostis algida Solander, in Phipps' Voy. 200. 1810.

Phippsia algida R. Br. Suppl. App. Parry's Voy. 275. 1824.

Smooth and glabrous throughout, culms 1′–5′ tall, erect, simple; ligule ½″ long; leaves 1′ in length or less, ¼″–1″ wide, obtuse; panicle ¼′–1½′ in length, coutracted; branches ¼′–¾′ long, erect or appressed; spikelets ½″–¾″ long; outer scales minute, unequal, acutish, the first often wanting; third scale broad, 1-nerved, obtuse, or sub-truncate and somewhat erose, the palet about two-thirds as long, broad, 2-keeled, erose-truncate,

Arctic regions of both the Old World and the New. Summer.

31. SPORÓBOLUS R. Br. Prodr. Fl. Nov. Holl. 1: 169. 1810.

[VILFA Beauv. Agrost. 16. 1812.]

Perenuial or rarely annual grasses, with flat or convolute leaves and open or contracted panicles. Spikelets generally small, 1-flowered, occasionally 2–3-flowered. Scales in the 1-flowered spikelets 3, membranous; the 2 outer empty, the first somewhat shorter; the third scale equalling or longer than the empty ones; palet 2-nerved. Stamens 2–3. Styles very short, distinct. Stigmas plumose. Grain free, and often early deciduous. [Greek, referring to the deciduous grain.]

About 80 species, in tropical and temperate regions, very numerous in America. Besides the following, 4 or 5 others occur in the southern and western United States.

Panicle contracted, spike-like.
- Spikelets more than 1¾″ in length.
  - Panicle terminal; upper sheaths 3′ long or more.
    - Leaves glabrous or very nearly so.
      - Third scale of the spikelet acuminate, much longer than the second and usually greatly exceeded by the palet. 1. *S. asper.*
      - Third scale of the spikelet acutish or obtuse, somewhat exceeding the second and equalling or a little shorter than the palet. 2. *S. longifolius.*
    - Leaves, at least the lower, papillose-hirsute. 3. *S. pilosus.*
  - Panicles terminal and lateral; sheaths 1½′ long or less. 4. *S. vaginaeflorus.*
- Spikelets 1½″ long or less.
  - Sheaths inflated, the uppermost usually enclosing the base of the panicle. 5. *S. neglectus.*
  - Sheaths not inflated; panicle exserted.
    - Branches of the panicle not crowded; third scale acuminate.
      - Outer scales of the spikelet obtuse or abruptly acute, less than half as long as the third scale; ligule about 1″ long, acutish. 6. *S. brevifolius.*
      - Outer scales of the spikelet acuminate and awn-pointed, more than half as long as the third scale; ligule less than ¼″ long, erose-truncate. 7. *S. cuspidatus.*
    - Branches of the panicle densely crowded; third scale acute.
      - Culms decumbent and branched at the base, from a stout horizontal rootstock; panicle short. 8. *S. Virginicus.*
      - Culms erect, simple, tufted; panicle usually elongated. 9. *S. Indicus.*

Panicle open, the branches more or less spreading, at least at maturity.
Pedicels equalling or shorter than the spikelets; first scale about half as long as the second.
Branches of the panicle verticillate.
Spikelets ¾″ long, green. 10. *S. argutus.*
Spikelets 1¼″–1½″ long, purple. 11. *S. junceus.*
Branches of the panicle alternate or sometimes sub-verticillate.
Spikelets about 1″ long; first scale lanceolate.
Sheaths naked or sparingly ciliate at the throat; panicle usually exserted. 12. *S. airoides.*
Sheaths densely pilose at the throat; base of the panicle generally included. 13. *S. cryptandrus.*
Spikelets 2″–2¾″ long; first scale subulate. 14. *S. heterolepis.*
Pedicels at least twice the length of the spikelets; first scale about equalling the second.
Culms erect, simple; leaves elongated.
Culms slender, from an annual root; outer scales about half the length of the spikelet. 15. *S. serotinus.*
Culms stout, from a horizontal rootstock: outer scales slightly shorter than the spikelet. 16. *S. compressus.*
Culms decumbent and branched below; leaves short. 17. *S. asperifolius.*

1. Sporobolus ásper (Michx.) Kunth. Rough Rush-grass. (Fig. 341.)

Agrostis aspera Michx. Fl. Bor. Am. 1: 52. 1803.
Sporobolus asper Kunth, Enum. 1: 210. 1833.
Sporobolus asper var. *Drummondii* Vasey, Contr. U. S. Nat. Herb. 3: 60. 1892.

Culms 2°–5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a mere ring, less than ¼″ long, naked; leaves 3′–15′ long, 1″–2″ wide at the base, attenuate into a long slender involute tip, smooth and glabrous beneath, scabrous above, or somewhat hairy at the base; panicle 2′–5′ in length, linear, strict, its branches 1′–2′ long, appressed; spikelets 3″–4″ long, the outer scales unequal, acute; third scale pubescent at the base, much longer than the second and greatly exceeded by the long-acuminate almost awned palet.

In dry soil, Delaware to Illinois, south to Florida and Texas. Aug.–Sept.

2. Sporobolus longifòlius (Torr.) Wood. Long-leaved Rush-grass. (Fig. 342.)

Agrostis longifolia Torr. Fl. U. S. 1: 90. 1824.
Sporobolus asper Vasey, Contr. U. S. Nat. Herb. 3: 59. 1892. Not Kunth, 1833.
Sporobolus longifolius Wood, Class-book, 775. 1861.

Culms 1½°–3½° tall, erect, simple or occasionally branched, smooth and glabrous. Sheaths shorter than the internodes; ligule very short, minutely ciliate; leaves 4′–18′ long, 1″–2″ wide at the base, attenuate into a long slender involute tip, smooth and glabrous beneath, scabrous and hairy at the base above; panicle more or less included in the upper sheath, 3′–10′ in length, linear, strict, the branches 1′–2′ long, erect; spikelets 2″–2½″ long; outer scales unequal, acutish, glabrous, the lower shorter; third scale glabrous, acutish or obtuse, exceeding the second and equalling or a little shorter than the obtuse palet.

In dry soil, Maine to Pennsylvania, Missouri and Kansas, south to Florida and Texas. Aug.–Sept.

3. Sporobolus pilòsus Vasey. Hairy Rush-grass. (Fig. 343.)

Sporobolus pilosus Vasey, Coult. Bot. Gaz. 16: 26. 1891.

Culms 1°–1½° tall, erect, rigid, stout, smooth and glabrous. Sheaths shorter than the internodes, crowded and overlapping at the base of the culm; ligule very short, minutely ciliate; leaves 3′–6′ long, 1″–2″ wide at base, erect, rigid, attenuate into a slender involute tip, the lower papillose-hirsute on both sides, the upper usually glabrous beneath, scabrous above and somewhat hairy near the base; panicle 2′–3′ in length, included at the base, erect, strict, its branches ½′–1′ long, erect; spikelets 2½″ long, the outer scales unequal, glabrous, obtuse, the lower shorter; third scale obtuse, glabrous, somewhat exceeding the second and equalling or a little longer than the obtuse palet.

In dry soil, Kansas and Missouri. Aug.–Sept.

4. Sporobolus vaginaeflòrus (Torr.) Wood. Sheathed Rush-grass. (Fig. 344.)

Vilfa vaginaeflora Torr.; A. Gray, Gram. and Cyp. No. 3. 1834.
Sporobolus vaginaeflorus Wood, Classbook, 775. 1861.
Sporobolus minor Vasey; A. Gray, Man. Ed. 6, 646. 1890.

Culms 8′–18′ tall, erect, slender, smooth or scabrous. Sheaths usually inflated, about half as long as the internodes; ligule very short; leaves 1″ wide or less, smooth and glabrous beneath, scabrous and hairy near the base above, attenuate into a slender involute point, the lower elongated, the upper 1′–3′ long, setaceous; panicles ¾′–2′ in length, the terminal one exserted or sometimes partially included, strict, the branches ½′ long or less, erect, the lateral ones enclosed in the sheaths; spikelets 1¾″–2¼″ long, the outer scales unequal, acuminate, smooth, the lower one shorter; third scale scabrous, especially toward the apex, about as long as the second and equalling or slightly exceeded by the very acute palet.

In dry soil, New York to Illinois and Missouri, south to Georgia and Texas. Aug.–Sept.

5. Sporobolus negléctus Nash. Small Rush-grass. (Fig. 345.)

Sporobolus vaginaeflorus Vasey; A. Gray, Man. Ed. 6, 645. 1890. Not Wood. 1863.
Sporobolus neglectus Nash, Bull. Torr. Club, 22: 464. 1895.

Culms 6′–12′ tall, erect from a usually decumbent base, slender, often much branched, smooth and glabrous. Sheaths about half as long as the internodes, inflated; ligule very short; leaves 1″ wide or less at the base, smooth and glabrous beneath, scabrous and hairy near the base above, attenuate into a slender point, the lower elongated, the upper 1′–3′ long, setaceous; terminal panicle 1′–2½′ in length, usually more or less included in the upper sheath, strict; lateral panicles enclosed in the sheaths; spikelets about 1½″ long, the outer scales acute, the lower one slightly shorter; third scale acute, glabrous, a little longer than the second and about equalling the acute palet.

In dry soil, Massachusetts to Kentucky and Kansas. Aug.–Sept.

6. Sporobolus brevifòlius (Nutt.) Scribn. Short-leaved Rush-grass. (Fig. 346.)

Agrostis brevifolia Nutt. Gen. 1: 44. 1818.
Sporobolus depauperatus Scribn. Bull. Torr. Club, 9: 103. In part. 1882.
Sporobolus brevifolius Scribn. Mem. Torr. Club, 5: 39. 1895.

Smooth and glabrous, culms 6′–18′ tall, arising from a horizontal rootstock, erect, slender, decumbent and branching at the base. Sheaths much shorter than the internodes; ligule ¾″–1″ long, acutish; leaves ½′–2′ long, involute-setaceous; panicle ½′–3′ in length, usually about 1½′, linear, its branches ¼′–½′ long, erect or appressed; spikelets 1¼″–1½″ long, the outer scales unequal, less than half as long as the third, obtuse or abruptly acute, scabrous on the keel and at the apex; third scale long-acuminate, sometimes cuspidate, scabrous toward the apex.

Anticosti Island and Maine to British Columbia, south in the mountains to New Mexico and California. Summer.

7. Sporobolus cuspidàtus (Torr.) Wood. Prairie Rush-grass. (Fig. 347.)

Vilfa cuspidata Torr.; Hook. Fl. Bor. Am. 2: 238. 1840.
Sporobolus cuspidatus Wood, Bot. & Fl. 385. 1870.
Sporobolus brevifolius Scribn. Mem. Torr. Club, 5: 39. In part. 1894.

Smooth and glabrous, culms 1°–2° tall, erect, simple or somewhat branched. Sheaths shorter than the internodes; ligule a mere ring, ¼″ long or less, erose-truncate; leaves 1′–4′ long, less than 1″ wide at the base, erect, involute-setaceous, at least when dry; panicle 1½′–5′ in length, slender, its branches ¼′–1′ long, appressed; spikelets 1¼″–1½″ long, the outer scales half to three-quarters as long, acuminate or cuspidate, scabrous on the keel; third scale long-acuminate and cuspidate, spariugly scabrous.

In dry soil, Manitoba to the Northwest Territory, south to Missouri and Kansas. Aug.–Sept.

8. Sporobolus Virgínicus (L.) Kunth. Seashore Rush-grass. (Fig. 348.)

Agrostis Virginica L. Sp. Pl. 63. 1753.
Sporobolus Virginicus Kunth. Rev. Gram. 1: 67. 1835.

Culms 6′–2° tall, erect or sometimes decumbent, simple or branched at the base, smooth and glabrous. Sheaths numerous, short, overlapping and crowded at the lower part of the culm, smooth, glabrous or sometimes pilose on the margins and at the throat; ligule a ring of short hairs; leaves 1′–8′ long, 2″ wide or less at the base, distichous, acuminate into a long point, involute on the margins and at the apex, smooth beneath, scabrous above or sometimes sparingly hairy; panicle 1′–3′ long, 2″–5″ thick, dense and spike-like, usually exserted; spikelets 1″–1¼″ long, the outer scales about equal, acute, smooth and glabrous; third scale smooth and glabrous, acute, slightly shorter than the second and about equalling the obtuse palet.

On sandy shores, Virginia to Florida, west to Texas and Mexico. Also in Cuba. Aug.–Sept.

9. Sporobolus Índicus (L.) R. Br. India Rush-grass. Smut-grass. (Fig. 349.)

Agrostis Indica L. Sp. Pl. 63. 1753.
Sporobolus Indicus R. Br. Prodr. Fl. Nov. Holl. 1: 170. 1810.

Glabrous and smooth throughout, culms 1°–4° tall, erect, tufted, simple or rarely sparingly branched. Sheaths few, long, shorter than the internodes; ligule a ring of very short hairs; leaves 1″–3″ wide, attenuate into a long slender point, the lower 8′–1° long, the upper shorter; panicle 4′–15′ in length, usually elongated, narrow, spike-like; spikelets ¾″–1″ long, the outer scales unequal, about half as long as the third, obtuse, smooth and glabrous, the lower one shorter and often erose-truncate; third scale acute, somewhat exceeding the obtuse or acutish palet.

In meadows and waste places, Virginia to Florida, west to Arkansas and California. Naturalized from tropical regions; very abundant in Central and South America. July–Sept.

10. Sporobolus argùtus (Nees) Kunth. Pointed Dropseed-grass. (Fig. 350.)

Vilfa arguta Nees, Agrost. Bras. 2: 395. 1829.
Sporobolus argutus Kunth, Enum. 1: 215. 1833.

Culms 1° tall or less, erect, or somewhat decumbent at the base, simple or sometimes branched, smooth and glabrous. Sheaths shorter than the internodes, their margins sometimes hirsute at the top; ligule a ring of short hairs; leaves 1′–2′ long, 1″–2″ wide at the base, acuminate, smooth and glabrous beneath, scabrous and often sparingly hairy at the base above; panicle 1½′–3′ in length, the branches ½′–1′ long, verticillate, at first appressed, finally widely spreading; spikelets ¾″ long; outer scales smooth and glabrous, the first rounded or obtuse, one-quarter the length of the acute second one; third scale about equalling the second, acute.

Kansas, the Indian Territory and Colorado, south to Texas and Mexico. Also in the West Indies. July–Sept.

11. Sporobolus júnceus (Michx.) Kunth. Purple Dropseed-grass. Wire-grass. (Fig. 351.)

Agrostis juncea Michx. Fl. Bor. Am. 1: 52. 1803.
Sporobolus junceus Kunth, Rev. Gram. 1: 68. 1835.

Glabrous and smooth throughout, culms 1°–2° tall, tufted, erect, slender, simple. Sheaths shorter than the internodes; ligule very short; leaves filiform or setaceous, the basal 6′–1° long, numerous, those of the culm few, 1′–3′ long; panicle 3′–7′ in length, open, the branches verticillate, the lower 1′–2′ long, widely spreading; spikelets 1¼″–1½″, purple, the outer scales very unequal, the first obtuse or acutish, one-fourth to one-third the length of the acute second one; third scale subacute or blunt, equalling the second and the obtuse palet.

Dry sandy soil, Virginia to Florida, west to Texas. Reported from Minnesota and Wisconsin. Aug.–Sept.

12. Sporobolus airoïdes Torr. Hair-grass Dropseed. (Fig. 352.)

Agrostis airoides Torr. Ann. Lyc. N. Y. 1: 151. 1824.
Sporobolus airoides Torr. Pac. R. R. Rept. 7: Part 3, 21. 1856.

Culms 1½°–3° tall, erect, simple, smooth and glabrous. Sheaths generally shorter than the internodes, sometimes sparsely ciliate at the throat; ligule very short; leaves smooth beneath, scabrous above and sometimes sparingly hairy near the base, ½″–1½″ wide at the base, attenuate into a long slender involute point, the basal about one-half as long as the culm, the upper culm leaves 2′–5′ in length; panicle 5′–15′ long, usually exserted, the branches alternate or the upper verticillate,, at length widely spreading, the lower 3′–7′ long; spikelets ¾″–1″ long, the scales acute, glabrous, the outer unequal, the lower one about half as long as the upper; third scale equalling the second and the palet.

Prairies, Nebraska to California, south to Texas and Arizona. Aug.–Sept.

13. Sporobolus cryptándrus (Torr.) A. Gray. Sand Dropseed. (Fig. 353.)

Agrostis cryptandra Torr. Ann. Lyc. N. Y. 1: 151. 1824.
Sporobolus cryptandrus A. Gray, Man. 576. 1848.

Culms 1½°–3½° tall, erect, simple or sometimes branched at the base, smooth and glabrous. Sheaths smooth, with a dense pilose ring at the summit, the lower short, crowded and overlapping, the upper much longer, geuerally euclosiug the base of the pauicle; ligule a ring of short hairs; leaves 3′–6′ long, 1″–2″ wide, flat, glabrous beneath, scabrous above, long-acuminate; panicle 6′–10′ in length, the base generally iucluded in the upper sheath, rarely eutirely exserted, the brauches spreading or ascending, alternate, the lower 1½′–3′ long; spikelets 1″–1¼″ long, the scales acute, glabrous, the outer scabrous ou the keel, the lower one-third as long as the upper; third scale somewhat longer or shorter than the secoud.

In sandy soil, coast of New England, along all the Great Lakes, west to Dakota, south in the interior to Missouri, Texas and Mexico. Aug.–Oct.

14. Sporobolus heterólepis A. Gray. Northern Dropseed. (Fig. 354.)

Vilfa heterolepis A. Gray, Ann. Lyc. N. Y. 3: 233. 1835.
Sporobolus heterolepis A. Gray, Man. 576. 1848.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths sometimes spariugly pilose at the summit, the lower short, loose, and overlapping, the upper much elongated and tight to the culm; ligule a ring of short hairs; leaves involute-setaceous, glabrous, the margins and upper part of the midrib very rough, the basal about three-fourths the length of the culm, occasionally equalling it, those of the culm shorter; panicle 3′–10′ in length, its branches erect or asceudiug, alternate or sub-verticillate, the lower 1½′–3½′ long; spikelets 2″–2¾″ long, the scales smooth and glabrous, the outer unequal, acuminate, the lower subulate, about half the length of the broad secoud oue, often awn-pointed; third scale obtuse or acute, shorter than the second or occasionally equalling it.

In dry soil, Quebec to Assiniboia, south to Pennsylvania, Illinois and Arkansas. Aug.–Sept.

15. Sporobolus serótinus (Torr.) A. Gray. Late-flowering Dropseed (Fig. 355.)

Agrostis serotina Torr. Fl. U. S. 1: 88. 1824.
Sporobolus serotinus A. Gray, Man. 577. 1848.

Glabrous and smooth or very nearly so. culms 6′–18′ tall, from an annual root, erect, slender, simple. Sheaths short, confined to the lower part of the culm; ligule less than ½″ in length, irregularly truncate; leaves ½″ wide or less, slightly scabrous above, flat, the basal one-third to half the length of the culm, those of the culm 2′–4′ long; panicle 3′–9′ in length, the branches capillary, erect or ascending, the lower 1′–2½′ long; spikelets about ⅝″ long, the outer scales subequal, obtuse, smooth or sometimes sparingly scabrous; third scale twice the length of the outer ones, acuminate.

In wet sandy soil, Maine to Michigan, south to New Jersey. Sept.–Oct.

16. Sporobolus compréssus (Torr.) Kunth. Flat-stemmed Dropseed. (Fig. 356.)

Agrostis compressa Torr. Cat. Pl. N. Y. 91. 1819.
Sporobolus compressus Kunth, Enum. 1: 217. 1833.

Culms 1°–2° tall, from a horizontal rootstock, stout, simple, much compressed, smooth and glabrous. Sheaths compressed, overlapping, sometimes scabrous at the summit; ligule very short; leaves 5′–10′ long, 1″ wide or less, folded, slightly rough; panicle 4′–10′ in length, the branches erect or ascending, the lower 2′–3′ long; spikelets about ⅞″ long; outer scales subequal, obtuse or somewhat acute, smooth and glabrous; third scale obtuse and apiculate, strongly scabrous, slightly exceeding the outer ones.

In bogs, Long Island and in the pine barrens of New Jersey. Sept.–Oct.

17. Sporobolus asperifòlius (Nees & Meyen) Thurber. Rough-leaved Dropseed. (Fig. 357.)

Vilfa asperifolia Nees & Meyen; Trin. Mem. Acad. St. Petersb. (VI.) 6: 95. 1840.
Sporobolus asperifolius Thurber; S. Wats. Bot. Cal. 2: 269. 1880.

Culms 6′–18′ tall, erect from a decumbent and branched base, smooth and glabrous. Sheaths short, crowded and overlapping, the upper usually enclosing the base of the panicle; ligule ¼″ long, erose-truncate; leaves numerous, 1′–3½′ long, 1″–1½″ wide at the base, acuminate, strict, often erect, flat, glabrous, smooth beneath, very rough above; panicle 3′–8′ in length, included at the base, rarely entirely exserted, the capillary branches spreading or ascending, the lower 2′–4′ long; spikelets occasionally 2–3-flowered, ¾″ long; outer scales subequal, acute, glabrous, sparingly scabrous; third scale obtuse or acute, glabrous, somewhat exceeding the second.

Dry soil, Assiniboia to British Columbia, south to Missouri, Nebraska, California and Mexico. Aug.–Sept.

32. POLYPÒGON Desf. Fl. Atl. 1: 66. 1798.

Mostly annual grasses, with decumbent or rarely erect culms, flat leaves and spike-like panicles. Spikelets 1-flowered; scales 3; the 2 outer empty, each extended into an awn; third scale smaller, generally hyaline, short-awned from below the apex, subtending a palet and perfect flower; palet shorter than the scale. Stamens 1–3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Greek, in allusion to the many long awns which resemble a beard.]

About 10 species, widely distributed in temperate and warm regions, rare in the tropics.

1. Polypogon Monspeliénsis (L.) Desf. Beard-grass. (Fig. 358.)

Alopecurus Monspeliensis L. Sp. Pl. 89. 1753.
Polypogon Monspeliensis Desf. Fl. Atl. 1: 67. 1798.

Culms 2° tall or less, erect from a usually decumbent base, smooth and glabrous. Sheaths generally shorter than the internodes, loose, sometimes slightly scabrous; ligule 1½″–4″ long; leaves 1½′–6′ long, 1½″–3″ wide, scabrous, especially above; panicle 1′–4′ in length, dense and spike-like, the branches ½′ in length, ascending; spikelets crowded; outer scales about 1″ long, obtuse, slightly bifid, scabrous, bearing a more or less bent awn 2″–3″ long; third scale much shorter, erose-truncate, hyaline, bearing a delicate awn about ¼″ long, inserted below the apex.

In waste places, New Hampshire to South Carolina, mostly near the coast. Very abundant in western North America, from British Columbia to Mexico. Naturalized from Europe. Native also of Asia. July–Sept.

33. ARCTAGRÓSTIS Griseb. in Ledeb. Fl. Ross. 4: 434. 1853.

A perennial grass with flat leaves and contracted panicle. Spikelets 1-flowered. Scales 3; the 2 outer empty, unequal, somewhat acute, membranous; the third scale exceeding the second, subtending a palet and perfect flower, obtuse; palet obtuse, 2-nerved. Stamens 2 or 3. Styles distinct, short. Stigmas plumose. Grain oblong, free, enclosed in the scale and palet. Seed adherent to the pericarp. [Latin, signifying an arctic *Agrostis*-like grass.]

A monotypic genus of arctic and subarctic regions.

1. Arctagrostis latifòlia (R. Br.) Griseb. Arctagrostis. (Fig. 359.)

Colpodium latifolium R. Br. Suppl. App. Parry's Voy. 286. 1824.
Arctagrostis latifolia Griseb. in Ledeb. Fl. Ross. 4: 434. 1853.

Culms 6′–2° tall, erect, or sometimes decumbent at the base, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 2″ long, truncate; leaves 1′–7′ long, 1″–4″ wide, usually erect, scabrous; panicle 1½′–8′ long, narrow, its branches ½′–2′ in length, ascending or erect; spikelets 1½″–2″ long; outer scales unequal, acutish, the lower about two-thirds to three-fourths the length of the upper; third scale obtuse, exceeding the second, hispid on the keel.

Greenland to Hudson Bay and Alaska. Also in arctic Europe and Asia. Summer.

34. CÍNNA L. Sp. Pl. 5. 1753.

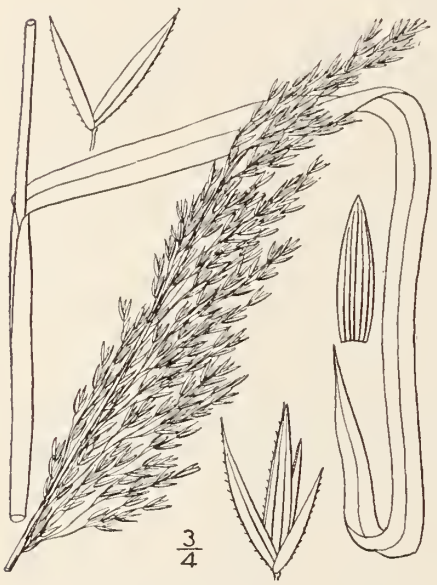
Tall grasses with flat leaves and panicled spikelets. Spikelets 1-flowered. Scales 3; the 2 outer empty, keeled, acute; the third scale similar, but usually short-awned on the back, subtending a palet and a stalked perfect flower; palet a little shorter, 1-nerved. Stamen 1. Styles short, distinct. Stigmas plumose. Grain narrow, free, enclosed in the scale and palet. Seed adherent to the pericarp. [Greek, taken from Dioscorides.]

Four known species, inhabiting the temperate regions of Europe and North America. Besides the following, another occurs in the western United States.

Panicle narrow at maturity, its filiform branches erect or drooping; spikelets 2″–2½″ long; first scale much shorter than the second. 1. *C. arundinacea.*

Panicle open, its capillary branches flexuous and drooping; spikelets 1½″ long; first scale about equalling the second. 2. *C. latifolia.*

1. Cinna arundinàcea L. Wood Reed-grass. (Fig. 360.)



Cinna arundinacea L. Sp. Pl. 5. 1753.

Culms 2°–5° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, overlapping at the base of the culm, smooth or roughish; ligule 1″–2″ long, truncate; leaves 6′–1° long, 2″–7″ wide, scabrous; panicle 6′–12′ in length, usually contracted, sometimes purple, the filiform branches erect or drooping, the lower 1½′–4½′ long; spikelets 2″–2½″ in length, the scales acute, scabrous, especially on the keel, the first one shorter than the second; third scale slightly exceeded or equalled by the second, usually bearing an awn about ¼″ long from the 2-toothed apex.

In moist woods and swamps, Newfoundland to the Northwest Territory, south to North Carolina, Louisiana, Missouri and Texas. Ascends to 1700 ft. in North Carolina. Aug.–Sept.

2. Cinna latifòlia (Trev.) Griseb. Slender Wood Reed-grass. (Fig. 361.)

Agrostis latifolia Treviran, in Goeppert, Beschr. d. Bot. Gart. Breslau, 82. 1830.

Cinna pendula Trin. Mem. Acad. St. Petersb. (VI.) 6: 280. 1841.

Cinna latifolia Griseb. in Ledeb. Fl. Ross. 4: 435. 1853.

Culms 2°–4° tall, erect, usually slender, simple, smooth and glabrous. Sheaths shorter than the internodes, sometimes slightly scabrous; ligule 1″–2″ long; leaves 4′–10′ long, 2″–6″ wide, scabrous; panicle 5′–10′ in length, open, the capillary branches generally spreading, flexuous and often drooping, the lower 1½′–5′ in length; spikelets 1½″ long; scales scabrous, the outer acute, strongly hispid on the keel, the first about equalling the second; third scale usually exceeded by the second and bearing a rough awn ½″–1″ long from the 2-toothed apex.

In damp woods, Newfoundland to British Columbia, south to New Jersey, in the Alleghanies to North Carolina, to Wisconsin, and in the Rocky Mountains to Colorado and Utah. Also in northern Europe. Ascends to 5000 ft. in the Adirondacks. Aug.-Sept.

35. AGRÓSTIS L. Sp. Pl. 6. 1753.

[TRICHODIUM Michx. Fl. Bor. Am. 1: 41. 1803.]

Annual or perennial tufted grasses with flat or bristle-like leaves and paniculate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, membranous, keeled, acute; the third shorter, obtuse, hyaline, sometimes bearing a dorsal awn, subtending a perfect flower; palet shorter than the scale, sometimes minute or wanting. Stamens usually 3. Styles distinct, short. Stigmas plumose. Grain free, enclosed in the scale. Seed adherent to the pericarp. [Name Greek, referring to the field habitat of many species.]

A genus of about 100 species, widely distributed throughout the world, particularly numerous in temperate regions. Besides the following some 15 others are found in western North America.

Palet conspicuous, at least one-third as long as the scale. 1. *A. alba.*
Palet inconspicuous, minute or wanting.
Branches of the contracted panicle short, spikelet-bearing to the base; third scale awnless. 2. *A. exarata.*
Branches of the panicle slender, naked below, spikelet-bearing from about the middle to the ends.
Third scale awned.
Awn very finely filiform and flexuous, at least twice the length of the spikelet which is ¾″ long. 3. *A. Elliottiana.*
Awn stouter, rigid, usually bent, less than twice the length of the spikelet.
Branches of the panicle generally ascending; spikelets 1″ long. 4. *A. canina.*
Branches of the panicle usually spreading; spikelets 1¼″–1½″ long. 5. *A. rubra.*
Third scale not awned, or very rarely bearing a short awn.
Culms weak, usually decumbent and often prostrate at base; leaves lax; spikelets ¾″ long. 6. *A. perennans.*
Culms and leaves erect.
Branches of the panicle capillary, elongated, usually dividing above the middle, the spikelets crowded at the extremities.
Spikelets ¾″–1″ long; leaves short. 7. *A. hiemalis.*
Spikelets 1¼″–1½″ long; leaves elongated. 8. *A. altissima.*
Branches of the panicle not elongated, dividing at or below the middle.
Spikelets about 1″ long; a grass of low elevations. 9. *A. intermedia.*
Spikelets 1¼″–1½″ long; a high mountain grass. 10. *A. Novae-Angliae.*

1. Agrostis álba L. Red-top. Fiorin. Herd's-grass. (Fig. 362.)

Agrostis alba L. Sp. Pl. 63. 1753.

Agrostis vulgaris With. Bot. Arr. Brit. Pl. Ed. 3, 132. 1796.

Agrostis alba var. *vulgaris* Thurber in A. Gray, Man. Ed. 6, 647. 1890.

Culms 8′–2½° tall, erect or decumbent at the base, often stoloniferous, simple, smooth and glabrous. Sheaths usually shorter than the internodes, often crowded at the base of the culm; ligule 4″ long or less; leaves 2′–8′ long, 1″–3″ wide, scabrous; panicle 2′–9′ in length, contracted or open, green or purplish, the branches ascending or erect, the lower 1′–3′ long; spikelets 1″–1¼″ long; outer scales about equal, acute, smooth and glabrous, except on the hispid or scabrous keel; third scale shorter, obtuse or acute, the palet at least one-third its length.

A most variable species occurring in fields and meadows nearly throughout North America, extensively cultivated for fodder. Naturalized from Europe, and perhaps also native northward. We have been unable satisfactorily to separate *A. sylvatica* L. from this. July–Sept.

2. Agrostis exaràta Trin. Rough-leaved Bent-grass. (Fig. 363.)

Agrostis exarata Trin. Unifl. 207. 1824.
Agrostis asperifolia Trin. Mem. Acad. St. Petersb. (VI.) 6: Part 2, 317. 1845.

Culms 1°–3° tall, erect, or sometimes decumbent at the base, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth or roughish; ligule 1″–3½″ long, more or less decurrent; leaves 1′–8′ long, 1″–4″ wide, generally erect, flat or involute, scabrous; panicle contracted, 2½′–10′ in length, often interrupted or glomerate, the branches 1½′–3′ in length, erect, spikelet-bearing to the base; spikelets crowded, 1″–2″ long, the outer scales subequal, scabrous, especially on the keel; third scale from less than one-half to three-fourths the length of the second, obtuse or subacute; palet minute.

Manitoba to Alaska, south to Wisconsin, Nebraska, Texas and California. Aug.–Sept.

3. Agrostis Elliottiàna Schultes. Elliott's Bent-grass. (Fig. 364.)

Agrostis arachnoides Ell. Bot. S. C. & Ga. 1: 134. 1817. Not Poir. 1810.
Agrostis Elliottiana Schultes, Mant. 2: 202. 1824.

Culms 5′–14′ tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous, strongly striate; ligule 1″ long; leaves rough, ½′–2′ long, 1″ wide or less; panicle 2′–5′ in length, usually narrow, sometimes open, the branches slender, naked below, erect or ascending, the lower 1′–1½′ long; spikelets ¾″ long; outer scales subequal, scabrous on the keel, acute; third scale about three-quarters as long as the first, erose-truncate, acute or 2-toothed, bearing a very finely filiform flexuous barbellate awn, 2–4 times its length, inserted just below the apex; palet short.

In dry soil, South Carolina to Kentucky and Missouri, south to Florida and Texas. May–July.

4. Agrostis canìna L. Brown Bent-grass. (Fig. 365.)

Agrostis canina L. Sp. Pl. 62. 1753.

Culms 1°–2° tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ½″–1½″ long; leaves 1′–3′ in length, 1″ wide or less, scabrous; panicle 2′–7′ in length, contracted in fruit, the branches slender, naked below, ascending or spreading in flower, the lower 1′–2½′ long; spikelets 1″ long, on appressed pedicels, the outer scales subequal, acute, strongly scabrous on the keel; third scale about two-thirds the length of the first, obtuse, smooth and glabrous, bearing a straight or somewhat bent dorsal awn 1″–2″ long, inserted just above the middle; palet minute or none.

In meadows, Newfoundland to Alaska, south to Pennsylvania and Tennessee. Native northward; naturalized om Europe southward. A variable species. July–Sept.

5. Agrostis rùbra L. Red Bent-grass. (Fig. 366.)

Agrostis rubra L. Sp. Pl. 62. 1753.
Agrostis rupestris Chapm. Fl. S. States, 551. 1860. Not All. 1785.
Agrostis rubra var. *Americana* Scribn.; Macoun, Cat. Can. Pl. 5: 391. 1890.

Smooth or very nearly so, glabrous, culms 6′–2° tall, erect or sometimes decumbent at the base, simple. Sheaths usually shorter than the internodes; ligule 1″ long; leaves 2′–4′ long, ½″–1½″ wide; panicle 2½′–5′ in length, open, the branches generally widely spreading and more or less flexuous, rarely erect, the lower 1′–2½′ long; spikelets 1¼″–1½″ long, the outer scales acute, scabrous on the keel; third scale shorter than the first, obtuse, bearing a usually bent dorsal awn 2″–2½″ long, inserted below the middle.

Summits of the highest mountains of New England, New York and North Carolina. The American plant may be specifically different from the European. Summer.

6. Agrostis perénnans (Walt.) Tuckerm. Thin-grass. (Fig. 367.)

Cornucopiae perennans Walt. Fl. Car. 74. 1788.
Agrostis perennans Tuckerm. Am. Journ. Sci. 45: 44. 1843.

Culms 1°–2½° long from a decumbent or prostrate base, weak, slender, simple or sparingly branched above, smooth and glabrous; ligule ½″ long; leaves 2′–6′ long, 1″–2″ wide, lax, scabrous; panicle 4′–8′ in length, open, the branches 1′–2′ long, widely spreading, the branchlets and pedicels divergent; spikelets ¾″–1″ long, the outer scales acute, scabrous on the keel; third scale about three-quarters the length of the first, smooth and glabrous, not awned; palet small or wanting.

In shaded damp places, Quebec and Ontario to Wisconsin, south to South Carolina and Tennessee. Ascends to 6600 ft. in North Carolina. Panicle usually light green, sometimes purplish. July–Sept.

7. Agrostis hyemàlis (Walt.) B.S.P. Rough Hair-grass. (Fig. 368.)

Cornucopiae hyemalis Walt. Fl. Car. 73. 1788.
Agrostis scabra Willd. Sp. Pl. 1: 370. 1798.
Agrostis hyemalis B.S.P. Prel. Cat. N.Y. 68. 1888.

Culms 1°–2° tall, erect, slender, simple, smooth and glabrous. Sheaths generally shorter than the internodes; ligule 1″–2″ long; leaves 2′–5′ long, ¼″–1½″ wide, usually erect, roughish; panicle 6′–2° long, usually purplish, the capillary scabrous branches ascending, sometimes widely spreading, or often drooping, the lower 3′–6′ long, dividing above the middle, the divisions spikelet-bearing at the extremities; spikelets ¾″–1″ long, the outer scales acute, scabrous toward the apex and on the keel; third scale two-thirds the length of the first or equalling it, obtuse, rarely bearing a short awn; palet usually very small.

In dry or moist soil throughout nearly the whole of North America except the extreme north. July–Aug.

8. Agrostis altíssima (Walt.) Tuckerm. Tall Bent-grass. (Fig. 369.)

Cornucopiae altissima Walt. Fl. Car. 74. 1788.

Agrostis altissima Tuckerm. Am. Journ. Sci. **45**: 44. 1843.

Agrostis elata Trin. Mem. Acad. St. Petersb. (VI.) Part 2, 364. 1845.

Culms 2°–4° tall, erect, simple, smooth, usually stiff. Sheaths overlapping, scabrous, the upper one elongated; ligule 1″–2″ long; leaves elongated, 6′–1° in length, 1″–1½″ wide, scabrous; panicle 7′–9′ long, the branches ascending or erect, somewhat scabrous, the lower 2′–4′ in length, spikelet-bearing at the extremities; spikelets 1¼″–1½″ long, the outer scales acute, scabrous on the keel; third scale shorter, obtuse, scabrous, occasionally bearing a short awn; palet small or wanting.

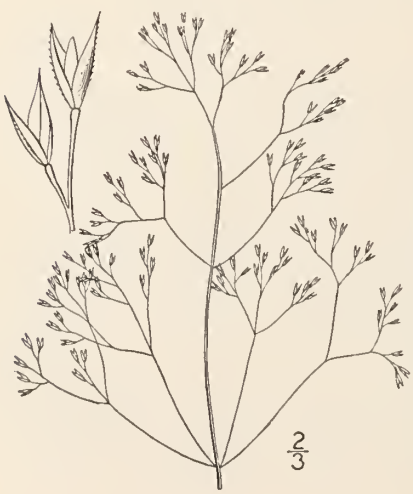
In sandy swamps, New Jersey to Florida and Alabama. Panicle usually purplish. Aug.–Oct.

9. Agrostis intermèdia Scribn. Upland Bent-grass. (Fig. 370.)

Agrostis intermedia Scribn. Bull. Tenn. Agric. Exp. Sta. **7**: 76. 1894.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths smooth, those at the base of the culm often crowded and overlapping; ligule 1″–2″ long; leaves 4′–9′ long, 1″–3″ wide, scabrous; panicle 4′–9′ in length, the branches 1½′–3′ long, ascending, dividing at or below the middle, the divisions divergent, the pedicels appressed; spikelets about 1″ long, the outer scales acute or acuminate, scabrous on the keel; third scale about three-fourths the length of the first, smooth; palet small or wanting.

In dry soil, New York to Tennessee and Missouri. Intermediate in aspect between *A. altissima* and *A. perennans*. Aug.–Oct.



10. Agrostis Nòvae-Ángliae Tuckerm. New England Bent-grass. (Fig. 371.)

Agrostis Novae-Angliae Tuckerm. Hovey's Mag. **9**: 143. April, 1843.

Agrostis altissima var. *laxa* Tuckerm. Am. Journ. Sci. **45**: 44. October, 1843.

Culms 8′–15′ tall, erect, simple, smooth and glabrous. Sheaths longer than the internodes, generally overlapping; ligule 1″ long; leaves 1′–3½′ long, 1″ wide or less, erect, usually involute, scabrous; panicle 3½′–7′ in length, open, the branches spreading or ascending, dividing at or below the middle, the divisions divergent, the pedicels often appressed; spikelets 1¼″–1½″ long, the outer scales acute, strongly scabrous on the keel; third scale somewhat shorter, obtuse.

Newfoundland, south to the high mountains of New England, New York and North Carolina.

36. CALAMAGRÓSTIS Adans. Fam. Pl. 2: 31. 1763.

[Deyeuxia Clarion; Beauv. Agrost. 43. *pl. 9. f. 9, 10.* 1812.]

Generally perennial grasses, of various habit, with flat leaves and paniculate inflorescence. Spikelets 1-flowered, the rachilla usually prolonged beyond the flower and pubescent. Scales 3; the 2 outer empty, carinate, membranous; the third scale hyaline, shorter than the outer, obtuse, usually copiously long-hairy at the base, or rarely the hairs scanty or short, and bearing a straight, bent or twisted dorsal awn; palet shorter, 2-nerved. Stamens 3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale. Seed adherent to the pericarp. [Greek, signifying Reed-grass.]

A genus of about 130 species, widely distributed throughout temperate and mountainous regions, and particularly numerous in the Andes. Besides the following, some 20 others occur in the western parts of North America. The English name *Small-reed* is applied to any of the species.

Panicle open, the branches spreading or ascending, usually long and lax.
- Spikelets 1″ long; outer scales acute. 1. *C. Macouniana.*
- Spikelets 1½″–2″ long; outer scales acute; awn slender. 2. *C. Canadensis.*
- Spikelets 2″–3″ long; outer scales acuminate; awn stouter. 3. *C. Langsdorfii.*

Panicle narrow or contracted, the branches erect, at least in fruit, usually short and strict.
- Basal hairs one-third the length of the scale or less.
  - Awn strongly twisted, inserted near the base of the scale; leaves long. 4. *C. Porteri.*
  - Awn not twisted, bent, inserted just below the middle of the scale; leaves short. 5. *C. breviseta.*
- Basal hairs one-half the length of the scale or more.
  - Spikelets 1½″–2″ long; prolongation of the rachilla hairy its whole length.
    - Leaves flat; basal hairs equalling or somewhat shorter than the scale. 6. *C. confinis.*
    - Leaves involute in drying; basal hairs half as long as the scale. 7. *C. neglecta.*
  - Spikelets 3″–4″ long; prolongation of the rachilla with a terminal tuft of hairs. 8. *C. cinnoides.*

1. Calamagrostis Macouniàna Vasey. Macoun's Reed-grass. (Fig. 372.)

Deyeuxia Macouniana Vasey, Coult. Bot. Gaz. 10: 297. 1885.
Calamagrostis Macouniana Vasey, Contr. U. S. Nat. Herb. 3: 81. 1892.

Culms 2°–3° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 1″ long; leaves 3′–7′ long, 1″–2½″ wide, erect, acuminate, scabrous; panicle open, 3′–4½′ in length, the branches ascending, or sometimes erect, the lower 1′–1½′ long, naked at the base; spikelets 1″ long, the outer scales acute, scabrous, the first shorter than the second; third scale equalling the second, the awn a little exceeding it; basal hairs about as long as the scale.

Manitoba and Assiniboia. Summer.

2. Calamagrostis Canadénsis (Michx.) Beauv. Blue-joint Grass. (Fig. 373.)

Arundo Canadensis Michx. Fl. Bor. Am. 1: 73. 1803.
Calamagrostis Canadensis Beauv. Agrost. 15. 1812.

Culms 2°–5° tall, erect, simple, smooth or somewhat scabrous. Sheaths shorter than the internodes; ligule 1″–3″ long; leaves 6′–1° long or more, 1″–4″ wide, rough; panicle 4′–7′ in length, open, usually purplish, the branches spreading or ascending, the lower 1½′–3′ long, naked at the base; spikelets 1½″–2″ long, the outer scales equal or subequal, acute, strongly scabrous; third scale equalling or slightly shorter than the second, scabrous, the awn delicate and equalling the copious basal hairs which are about as long as the scale or some of them shorter.

In swamps and wet soil, Newfoundland to Alaska, south to North Carolina, New Mexico and California. Ascends to 5000 ft. in the Adirondacks. July–Sept.

3. Calamagrostis Langsdórfii (Link) Trin. Langsdorf's Reed-grass. (Fig. 374.)

Arundo Langsdorfii Link, Enum. 1: 74. 1821.
Calamagrostis Langsdorfii Trin. Unifl. 225. *pl. 4. f. 10.* 1824.

Culms 2°–4° tall, erect, simple, smooth or roughish. Sheaths shorter than the internodes; ligule 1″–3″ long; leaves 4′–12′ long, 2″–4″ wide, scabrous; panicle 2′-6′ in length, the branches ascending or sometimes erect, the lower 1′–2′ long, naked at the base; spikelets 2″–3″ long, the outer scales acuminate, strongly scabrous; third scale equalling or shorter than the second, scabrous, the stout awn as long as or a little exceeding the copious basal hairs which are usually somewhat shorter than the scale.

Newfoundland to Alaska, south to the mountains of New England and New York, and to Manitoba and Washington. Also in northern Europe and Asia. Summer.

4. Calamagrostis Pòrteri A. Gray. Porter's Reed-grass. (Fig. 375.)

Calamagrostis Porteri A. Gray, Proc. Am. Acad. 6: 79. 1862.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, slightly scabrous, with a villous ring at the summit; ligule 1″–2″ long; leaves 6′–12′ long, 2″–4″ wide, rough; panicle 4′–8′ in length, the branches erect, the lower 1′–2′ long; spikelets 1″–2½″ long, the outer scales strongly scabrous, acute; third scale shorter than or equalling the second, obtuse, scabrous, the lateral basal hairs about one-third the length of the scale, those at the back short or wanting; awn bent, about equalling the scale, the lower part twisted.

In dry woods, Pennsylvania and southern New York. Aug.-Sept.

5. Calamagrostis brevisèta (A. Gray) Scribn. Pickering's Reed-grass. (Fig. 376.)

Calamagrostis sylvatica var. *breviseta* A. Gray, Man. 582. 1848.
Calamagrostis Pickeringii A. Gray, Man. Ed. 2, 547. 1856.
Calamagrostis breviseta Scribn. Mem. Torr. Club, 5: 41. 1894.

Culms 12′–18′ tall, erect, rigid, simple, scabrous below the panicle. Sheaths smooth and glabrous, the lower overlapping, the upper one elongated; ligule 1″–3″ long; leaves 1½′–4′ long, 2″ wide, erect, smooth beneath, rough above; panicle 3′–4½′ in length, the branches ascending or erect, the lower 1′–1½′ long; spikelets 1½″–2″ long, purple tinged, the outer scales acute, scabrous on the keel; third scale shorter than the second, obtuse, scabrous, the basal hairs very short; awn bent, not twisted, equalling or slightly exceeding the scale.

In wet places, Cape Breton Island to New Hampshire and Massachusetts. Occurs in the alpine region of the White Mountains. Aug.–Sept.

6. Calamagrostis confînis (Willd.) Nutt. Bog Reed-grass. (Fig. 377.)

Arundo confinis Willd. Enum. 1: 127. 1809.
Calamagrostis confinis Nutt. Gen. 1: 47. 1818.
Calamagrostis robusta Vasey, Contr. U. S. Nat. Herb. 3: 82. 1892.

Culms 1½°–3° tall, erect, simple, smooth or rough. Sheaths shorter than the internodes; ligule about 1″ long; leaves 2″ wide or less, rough, flat, or involute at the apex, the basal often one-half to two-thirds as long as the culm, the stem leaves 2′–10′ long; panicle contracted, 2½′–9′ in length, the branches 1′–2′ long, erect; spikelets 1½″–2″ long, the scales somewhat scabrous, the outer acute; third scale obtuse, the basal hairs equalling it or three-fourths as long; awn more or less bent, from a little shorter to slightly longer than the scale.

In bogs, Vermont, New York and Pennsylvania to Vancouver Island, south in the Rocky Mountains to New Mexico. Aug.–Sept. Specimens of this grass have been referred to *C. Lapponica* (Link) Trin., but we have been unable to prove the occurrence of that species within our area.

7. Calamagrostis neglècta (Ehrh.) Gaertn. Narrow Reed-grass. (Fig. 378.)

Arundo neglecta Ehrh. Beitr. 6: 137. 1791.
Calamagrostis neglecta Gaertn. Fl. Wett. 1: 94. 1799.
Calamagrostis stricta Beauv. Agrost. 15. 1812.

Glabrous and smooth throughout, culms 1½°–2½° tall, erect, simple, slender. Sheaths shorter than the internodes; ligule ½″ long or less, truncate; leaves narrow, involute in drying, the basal one-third as long as the culm, those of the culm 2′–5′ long, erect; panicle contracted, 2½′–4′ in length, the branches 1′ long or less, erect; spikelets 2″ long, the scales scabrous, the outer acute; third scale obtuse, about three-fourths as long as the second and nearly twice the length of the basal hairs; awn bent, exceeding the scale.

Labrador and Newfoundland to Washington. Also in Europe. Summer.

8. Calamagrostis cinnoìdes (Muhl.) Scribn. Nuttall's Reed-grass. (Fig. 379.)

Arundo cinnoides Muhl. Gram. 187. 1817.
Calamagrostis Nuttalliana Steud. Syn. Pl. Gram. 190. 1855.
Calamagrostis cinnoides Scribn. Mem. Torr. Club, 5: 42. 1895.

Culms 3°–5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or rough, the lower sometimes sparingly hirsute, and rarely with a villous ring at the summit; ligule 1″–2″ long; leaves 4′–1° long or more, 2″–5″ wide, attenuate into a long point, scabrous, occasionally sparingly hirsute; panicle 3′–7′ in length, contracted, the branches erect, the lower 1′–2′ long; spikelets 3″–4″ long; scales strongly scabrous, the outer about equal, acuminate and awn-pointed; third scale shorter, obtuse, the basal hairs one-half to two-thirds its length; awn stout, exceeding or equalling the scale; prolongation of the rachilla bearing a terminal tuft of hairs.

In moist soil, New Hampshire and Massachusetts to Pennsylvania, south to Georgia. Ascends to 2000 ft. in Pennsylvania. July–Aug.

37. AMMÓPHILA Host. Gram. Austr. 4: 24. *pl. 41.* 1809.

Tall perennial grasses with flat leaves, convolute above, and dense spike-like panicles. Spikelets 1-flowered, the rachilla prolonged beyond the flower and hairy. Scales 3, rigid, chartaceous, acute, keeled; the 2 outer empty, the lower 1-nerved, the upper 3-nerved; third scale 5-nerved, with a ring of short hairs at the base, subtending a chartaceous 2-nerved palet and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, signifying sand-loving, in allusion to the habitat of these grasses.]

Two species, the following widely distributed along the fresh and salt-water shores of the northern hemisphere, the other European.

1. Ammophila arenària (L.) Link. Sea Sand-reed. Sea Mat-weed. Maram. (Fig. 380.)

Arundo arenaria L. Sp. Pl. 82. 1753.
Calamagrostis arenaria Roth, Fl. Germ. 1: 34. 1788.
Ammophila arundinacea Host, Gram. Austr. 4: 24. 1809.
Ammophila arenaria Link, Hort. Berol. 1: 105. 1827.

Glabrous, culms 2°–4° tall, erect, rigid, stout, smooth, arising from a long horizontal branching rootstock. Sheaths smooth, the lower short, crowded and overlapping, the upper longer; ligule a mere ring; leaves 6′–1° long or more, rigid, attenuate into a long slender involute point, smooth beneath, scabrous above; spike-like panicle dense, 4′–12′ in length, 6″–8″ thick, its branches 1½′ long or less, appressed; spikelets 5″–6″ long, the scales scabrous, about equal in length, the third usually with the rudiment of an awn just below the apex; basal hairs 1″–2″ long.

In sands of the sea coast from New Brunswick to Virginia, and inland along the shores of the Great Lakes. Also on the coasts of northern Europe. Aug.–Sept.

38. CALAMOVÍLFA Hack. True Grasses, 113. 1890.

Tall grasses with stout horizontal rootstocks, elongated leaves, which are involute at the apex, and paniculate inflorescence. Spikelets 1-flowered, the rachilla not prolonged beyond the flower. Scales 3, 1-nerved, acute, the 2 outer unequal, empty; third scale longer or shorter than the second, with a ring of hairs at the base; palet strongly 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free. Seed adherent to the pericarp. [Greek, signifying a reed-like grass.]

Three known species, natives of the temperate and subtropical regions of North America.

Spikelets 2″–2½″ long, the basal hairs less than half the length of the third scale. 1. *C. brevipilis.*
Spikelets 3″–4″ long, the basal hairs more than half the length of the third scale. 2. *C. longifolia.*

1. Calamovilfa brevípilis (Torr.) Hack. Short-haired Reed-grass. (Fig. 381.)

Arundo brevipilis Torr. Fl. U. S. 1: 95. 1824.
Calamagrostis brevipilis A. Gray, Man. 582. 1848.
Calamovilfa brevipilis Hack. True Grasses, 113. 1890.

Glabrous and smooth or very nearly so, culms 2°–4° tall, erect, simple. Sheaths shorter than the internodes; ligule a ring of very short hairs; leaves 6′–12′ long, 1½″ wide or less, attenuate into a long slender involute tip, smooth beneath, slightly scabrous above; panicle open, 5′–10′ in length, the branches ascending, the lower 2′–4′ long; spikelets 2″–2½″ long; scales acute, scabrous toward the apex, the outer unequal, the first one-half as long as the second; third scale exceeding the second, pubescent on the lower half of the keel; basal hairs one-third the length of the scale; palet nearly equalling the scale, pubescent on the lower half of the keel.

In swamps, pine barrens of New Jersey. Local. Aug.–Sept.

2. Calamovilfa longifòlia (Hook.) Hack. Long-leaved Reed-grass. (Fig. 382.)

Calamagrostis longifolia Hook. Fl. Bor. Am. 2: 241. 1840.

Calamovilfa longifolia Hack. True Grasses, 113. 1890.

Culms 2°–6° tall, erect, simple, stout, smooth and glabrous. Sheaths crowded and overlapping, glabrous or rarely pilose; ligule a ring of hairs about 1″ long; leaves 8′–1° long or more, panicle narrow, often 1° long or more, pale, the branches erect or ascending, the lower 4′–10′ long; spikelets 3″–4″ long; scales acute, smooth, the first shorter than the second; the third a little longer or slightly shorter than the second, and nearly twice the length of the copious basal hairs; palet slightly shorter than the third scale.

On sandy shores, western Ontario and Manitoba to the Rocky Mountains, south to Indiana, Kansas and Colorado. July–Sept.

39. APÈRA Adans. Fam. Pl. 2: 495. 1763.

Annual grasses with narrow flat leaves, and ample open or contracted panicles. Spikelets 1-flowered, small, the rachilla prolonged beyond the flower into a bristle. Scales 3; the 2 outer empty, unequal, thin, membranous, keeled, acute; the third scale a little shorter, membranous, bearing a long slender awn inserted just below the shortly 2-toothed apex; palet a little shorter than the scale, 2-keeled, 2-toothed. Stamens 3. Styles distinct, short. Stigmas plumose. Grain narrow, free, included in the scale. Seed adherent to the pericarp. [Greek, signifying not mutilated, whole or entire; application uncertain.]

Two species, natives of Europe and western Asia.

1. Apera Spìca-vénti (L.) Beauv. Silky Bent-grass. Windlestraw. (Fig. 383.)

Agrostis Spica-venti L. Sp. Pl. 61. 1753.

Apera Spica-venti Beauv. Agrost. 151. 1812.

Culms 1°–2° tall, erect, simple, slender, smooth and glabrous. Sheaths usually longer than the internodes, the upper one generally including the base of the panicle; ligule 1″–3″ long; leaves 1′–7′ long, ½″–2″ wide, scabrous; panicle 3′–9′ in length, the branches erect or ascending, capillary, 1½′–3′ long; outer scales of the spikelet 1″–1¼″ long, acute, smooth and shining; third scale hairy or nearly smooth, bearing a dorsal scabrous awn 3″–4″ long; rudiment at the end of the rachilla less than ¼″ long.

In waste places and on ballast, Maine to southern New York and Pennsylvania. Adventive from Europe. June–July.

40. HÓLCUS L. Sp. Pl. 1047. 1753.

Annual or perennial grasses with flat leaves and spike-like or open panicles. Spikelets deciduous, 2-flowered; lower flower perfect, upper staminate. Scales 4; the 2 lower empty, membranous, keeled, the first 1-nerved, the second 3-nerved and often short-awned; flowering scales chartaceous, that of the upper flower bearing a bent awn. Palet narrow, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale. [Greek, taken from Pliny.]

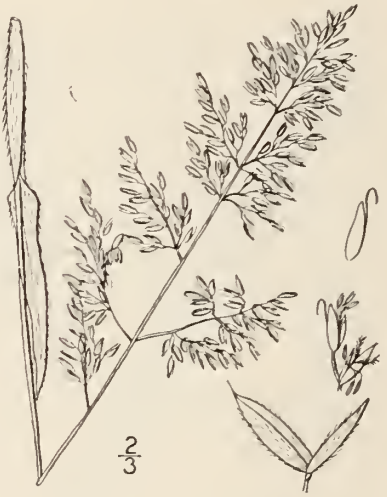
About 8 species, natives of the Old World.

1. Holcus lanàtus L. Velvet-grass. Meadow Soft-grass. (Fig. 384.)

Holcus lanatus L. Sp. Pl. 1048. 1753.

Softly and densely pubescent, light green, culms 1½°–3° tall, erect, often decumbent at the base, simple. Sheaths shorter than the internodes; ligule ½″–1″ long; leaves 1′–6′ long, 2″–6″ wide; spikelets 2″ long, the empty scales white-villous, the upper awn-pointed; flowering scales 1″ long, smooth, glabrous and shining, the lower sparsely ciliate on the keel, somewhat obtuse, the upper 2-toothed and bearing a hooked awn just below the apex.

In fields, meadows and waste places, Nova Scotia to Ontario and Illinois, south to North Carolina and Tennessee. Also on the Pacific Coast. Naturalized from Europe. June–Aug.



41. AÌRA L. Sp. Pl. 63. 1753.

Mostly annual grasses with narrow leaves and contracted or open panicles. Spikelets small, 2-flowered, both flowers perfect. Scales 4; the 2 lower empty, thin-membranous, acute, subequal, persistent; the flowering scales usually contiguous, hyaline, mucronate or 2-toothed, deciduous, bearing a delicate dorsal awn inserted below the middle; palet a little shorter than the scale, hyaline, 2-nerved. Stamens 3. Stigmas plumose. Grain enclosed in the scale and palet, and often adhering to them. [Greek name for *Lolium temulentum.*]

Four or five species, natives of Europe.

Panicle open; flowering scales about 1″ long; plants 5′–10′ tall.	1. *A. caryophyllea.*
Panicle contracted; flowering scales about 1½″ long; plants 2′–4′ tall.	2. *A. praecox.*

1. Aira caryophýllea L. Silvery Hair-grass. (Fig. 385.)

Aira caryophyllea L. Sp. Pl. 66. 1753.

Smooth and glabrous throughout, culms 5′–10′ tall, erect from an annual root, simple, slender. Sheaths mostly basal; ligule 1½″ long; leaves ½′–2′ long, involute-setaceous; panicle 1′–4′ in length, open, the branches spreading or ascending, the lower 1′ long or less; spikelets 1″–1¼″ long, the empty scales acute; flowering scales very acute, 2-toothed, 1″ long, bearing an awn 1½″–2″ long.

In fields and waste places, eastern Massachusetts to Virginia. Also on the Pacific coast. Local. Naturalized from Europe. Panicle silvery, shining. May–July.

2. Aira praècox L. Early Hair-grass. (Fig. 386.)

Aira praecox L. Sp. Pl. 65. 1753.

Glabrous and smooth throughout, culms 2′–4′ tall, erect, from an annual root, simple, rigid. Sheaths clothing the whole culm, the upper one often enclosing the base of the panicle; ligule about 1½″ long; leaves 1′ long or less, involute-setaceous; panicle contracted, strict, ½′–1′ in length; spikelets about 1½″ long, the empty scales acute; the flowering scales acuminate, 2-toothed, about 1½″ long, bearing an awn 1½″–2″ long.

In dry fields, southern New Jersey and Pennsylvania to Virginia. Naturalized from Europe. May–July.

42. DESCHÁMPSIA Beauv. Agrost. 91. *pl. 18. f. 3.* 1812.

Perennial grasses with flat or involute leaves, and contracted or open panicles. Spikelets 2-flowered, both flowers perfect, the hairy rachilla extended beyond the flowers or rarely terminated by a staminate one. Scales 4 (rarely more), the 2 lower empty, keeled, acute, membranous, shining, persistent; the flowering scales of about the same texture, deciduous, bearing a dorsal awn, the apex toothed. Palet narrow, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale. [In honor of J. C. A. Loiseleur-Deslongchamps, 1774–1849, French physician and botanist.]

About 20 species, inhabiting cold and temperate regions, a few occurring in the high mountains of the tropics. Besides the following, some 6 others occur in the western parts of North America.

Upper flowering scale reaching or extending beyond the apex of the empty scales.
Flowering scales about 1¼″ long, erose-truncate; leaves flat. 1. *D. caespitosa.*
Flowering scales about 2″ long, acute or obtuse; leaves involute. 2. *D. flexuosa.*
Empty scales extending much beyond the upper flowering scale. 3. *D. atropurpurea.*

1. Deschampsia caespitòsa (L.) Beauv. Tufted Hair-grass. (Fig. 387.)

Aira caespitosa L. Sp. Pl. 64. 1753.
Deschampsia caespitosa Beauv. Agrost. 160. *pl. 18. f. 3.* 1812.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths much shorter than the internodes; ligule 1″–3″ long; leaves flat, 1″–1½″ wide, smooth beneath, strongly scabrous above, the basal ones numerous, one-quarter to one-half as long as the culm, those of the culm 2′–6′ long; panicle open, 3′–9′ in length, the branches widely spreading or ascending, often somewhat flexuous, naked at the base, the lower 2′–5′ long; spikelets 1¾″–2″ long; flowering scales about 1¼″ long, erose-truncate at the apex, the awns somewhat shorter or a little longer, the upper scale reaching to or extending beyond the apices of the empty ones.

Newfoundland to Alaska, south to New Jersey, Illinois, Minnesota and in the Rocky Mountains and Sierra Nevada to New Mexico and California, mostly in wet soil. Also in Europe and Asia. July–Aug.

2. Deschampsia flexuòsa (L.) Trin. Wavy Hair-grass. (Fig. 388.)

Aira flexuosa L. Sp. Pl. 65. 1753.
Deschampsia flexuosa Trin. Bull. Acad. Sci. St. Petersb. 1: 66. 1836.

Glabrous throughout, culms 1°–2½° tall, erect, slender, simple, smooth. Sheaths much shorter than the internodes; ligule 1″ long or less; leaves involute-setaceous, smooth beneath, scabrous above, the basal very numerous, one-fifth the length of the culm or less, those of the culm 1′–3′ long; panicle open, 2′–8′ in length, the branches ascending or erect, sometimes widely speading, naked at the base, flexuous, the lower 1½′–5′ long; spikelets 2¼″–2½″ long; flowering scales about 2″ long, acutely toothed at the apex; awns bent and twisted, much exceeding the scale; upper scale reaching to or extending beyond the apices of the empty ones.

In dry soil, Greenland and Newfoundland to Ontario and Michigan, south to North Carolina and Tennessee. Ascends to 5100 ft. in the Adirondacks. Also in Europe. July–Aug.

3. Deschampsia atropurpùrea (Wahl.) Scheele. Mountain Hair-grass. (Fig. 389.)

Aira atropurpurea Wahl. Fl. Lapp. 37. 1812.
Deschampsia atropurpurea Scheele, Flora, 27: 56. 1844.

Glabrous and smooth or very nearly so, culms 6′–18′ tall, erect, simple, rigid. Sheaths shorter than the internodes; ligule 1″ long or less, truncate; leaves 1″–2″ wide, erect, sometimes slightly scabrous above, the basal 2½′–5′ long, those of the culm shorter; panicle contracted, usually purple or purplish, 1′–2′ in length, the branches erect, or sometimes ascending, the lower ½′–1½′ long; spikelets 2½″ long; flowering scales about 1¼″ long, erose-truncate at the apex; awns bent and much longer than the scales; upper scale much exceeded by the very acute outer ones.

On alpine summits of New York, New England, Montana, Oregon and Washington, north to Labrador and Alaska. Also in Europe. July–Aug.

43. TRISÈTUM Pers. Syn. 1: 97. 1805.

Mostly perennial tufted grasses, with flat leaves and spike-like or open panicles. Spikelets 2–4-flowered, the flowers all perfect, or the uppermost staminate; rachilla glabrous or pilose, extended beyond the flowers. Scales 4–6, membranous, the 2 lower empty, unequal, acute, persistent; flowering scales usually shorter than the empty ones, deciduous, 2-toothed, bearing a dorsal awn below the apex, or the lower one sometimes awnless. Palet narrow, hyaline, 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Latin, referring to the three bristles (one awn and two sharp teeth) of the flowering scales in some species.]

About 50 species, widely distributed in temperate or mountainous regions. Besides the following, about 8 others occur in the western parts of North America.

Flowering scales all bearing long dorsal awns.
Panicle contracted, dense; flowering scales 2½″ long or less. 1. *T. subspicatum.*
Panicle open, loose; flowering scales 2½″ long or more. 2. *T. flavescens.*
Lower flowering scale not bearing a long dorsal awn, a rudiment sometimes present. 3. *T. Pennsylvanicum.*

1. Trisetum subspicàtum (L.) Beauv. Narrow False Oat. (Fig. 390.)

Aira subspicata L. Syst. Veg. Ed. 10, 673. 1759.
Avena mollis Michx. Fl. Bor. Am. 1: 72. 1803.
Trisetum subspicatum Beauv. Agrost. 180. 1812.
Trisetum subspicatum var. *molle* A. Gray, Man. Ed. 2, 572. 1856.

Softly pubescent or glabrous, culms 6′–2° tall, erect, simple. Sheaths usually shorter than the internodes, ligule ½″–1″ long; leaves 1′–4′ long, ½″–2″ wide; panicle spike-like, 1′–5′ in length, often interrupted below, its branches 1½′ or less long, erect; spikelets 2–3-flowered, the empty scales hispid on the keel, shining, the second about 2½″ long, the first shorter; flowering scales 2″–2½″ long, acuminate, scabrous, each bearing a long bent and somewhat twisted awn.

In rocky places, Labrador to Alaska, south on the mountains to North Carolina, New Mexico and California. Also in Europe and Asia. Aug.–Sept.

2. Trisetum flavéscens (L.) R. & S. Yellow False Oat. (Fig. 391.)

Avena flavescens L. Sp. Pl. 809. 1753.
Trisetum pratense Pers. Syn. 1: 97. 1805.
Trisetum flavescens R. & S. Syst. 2: 663. 1817.

Culms 1½°–2½° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, more or less pubescent; ligule ½″ long; leaves 1½′–5′ long, 1″–3″ wide, scabrous, sometimes sparingly hairy; panicle open, 2′–5′ in length, the branches ascending or erect, somewhat flexuous, naked below, the lower 1′–2′ long; spikelets 3–4-flowered; empty scales smooth and glabrous, the second acute, 2½″ long, the first about half as long, narrower, acuminate; flowering scales 2½″–3″ long, scabrous, bearing a long bent and twisted awn.

Introduced into Missouri and Kansas. Native of Europe and Asia. Panicle yellow, turning dull brown. July–Aug.

3. Trisetum Pennsylvánicum (L.) Beauv. Marsh False Oat. (Fig. 392.)

Avena Pennsylvanica L. Sp. Pl. 79. 1753.
Avena palustris Michx. Fl. Bor. Am. 1: 72. 1803.
Trisetum Pennsylvanicum Beauv.; R. & S. Syst. 2: 658. 1817.
Trisetum palustre Torr. Fl. U. S. 1: 126. 1824.

Culms 1°–3° tall, erect, simple,. slender and often weak, smooth and glabrous. Sheaths shorter than the internodes, sometimes scabrous; ligule ½″ long; leaves 1′–6′ long, 1″–3″ wide, rough; panicle 2′–8′ in length, yellowish, narrow, the branches ascending, the lower 1′–2′ long; spikelets 2-flowered; outer scales smooth, shining, subequal, the second 2″–2½″ long; flowering scales 2″–2½″ long, scabrous, the lower not long-awned, but a rudimentary awn sometimes present, the upper with a long bent and twisted awn.

In swamps and wet meadows, New York to Illinois, south to Florida and Louisiana. Ascends to 3500 ft. in Virginia. Panicle sometimes loose and nodding. June–July.

44. AVÈNA L. Sp. Pl. 79. 1753.

Annual or perennial grasses, with usually flat leaves and panicled spikelets. Spikelets 2–many-flowered, or rarely 1-flowered; lower flowers perfect, the upper often staminate or imperfect. Scales 4–many (rarely 3); the 2 lower empty, somewhat unequal, membranous, persistent; flowering scales deciduous, rounded on the back, acute, generally bearing a dorsal awn, the apex often 2-toothed. Palet narrow, 2-toothed. Stamens 3. Styles short, distinct. Stigmas plumose. Grain oblong, deeply furrowed, enclosed in the scale and palet, free or sometimes adherent to the latter. [Old Latin name for the Oat.]

About 50 species, widely distributed in temperate regions, chiefly in the Old World. Oats (*Avena sativa* L.) sometimes appears in waste places or in fields where it has been cultivated.

Empty scales of the spikelet 6″ in length or less, shorter than the flowering scales.
Flowering scales with a ring of short hairs at the base; awn nearly as long as the scale. 1. *A. striata.*
Flowering scales naked at the base; awn not over one-half as long as the scale. 2. *A. Smithii.*
Empty scales of the spikelet 6″–9″ in length, enclosing the flowering scales. 3. *A. fatua.*

1. Avena striàta Michx. Purple Oat. (Fig. 393.)

Avena striata Michx. Fl. Bor. Am. 1: 73. 1803.

Culms 1°–2° tall, erect, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous; ligule ½″ long or less; leaves erect, 1′–6′ long, 1″–3″ wide, smooth beneath, usually scabrous above; panicle 2½′–5′ in length, lax, the branches erect or ascending, naked below, the lower 1′–2½′ long; spikelets 3–6-flowered, the empty scales smooth, the second 3″–3½″ in length, 3-nerved, the first two-thirds to three-quarters as long, 1-nerved; flowering scales 3″–4″ long, with a ring of short hairs at the base, strongly nerved, scabrous; awns as long as the scales or longer.

In woods, New Brunswick to British Columbia, south to northern Pennsylvania, Minnesota and Dakota. Ascends to 3000 ft. in the Adirondacks. Spikelets reddish-purple. July–Aug.

2. Avena Smíthii Porter. Smith's Oat. (Fig. 394.)

Avena Smithii Porter; A. Gray, Man. Ed. 3, 640. 1867.

Melica Smithii Vasey, Bull. Torr. Club, 15: 294. 1888.

Culms 2½°–5° tall, erect, simple, scabrous. Sheaths shorter than the internodes, very rough; ligule 2″ long; leaves 4′–8′ long, 3″–6″ wide, scabrous; panicle 6′–12′ in length, the branches finally spreading; spikelets 3–6-flowered; empty scales smooth, the second 3″–4″ in length, 5-nerved, the first shorter, obscurely 3-nerved; flowering scales 5″ long, naked at the base, strongly nerved, scabrous, bearing an awn one-fourth to one-half their length.

Northern Michigan and Isle Royal. Summer.

3. Avena fátua L. Wild Oat. (Fig. 395.)

Avena fatua L. Sp. Pl. 80. 1753.

Culms 1°–4° tall, erect, simple, stout, smooth and glabrous. Sheaths smooth, or scabrous at the summit, sometimes sparingly hirsute, the lower often overlapping; ligule 1″–2″ long; leaves 3′–8′ long, 1″–4″ wide; panicle open, 4′–12′ in length, the branches ascending; spikelets 2–4-flowered, drooping; outer scales ¾′–1′ in length, smooth, enclosing the flowering scales; flowering scales 6″–9″ long, with a ring of stiff brown hairs at the base, pubescent with long rigid brown hairs, bearing a long bent and twisted awn.

In fields and waste places, Dakota and Minnesota; abundant on the Pacific Coast. Naturalized from Europe or Asia. July–Sept.

45. ARRHENATHÈRUM Beauv. Agrost. 55. *pl. 11. f. 5.* 1812.

Tall perennial grasses, with flat leaves and contracted or open panicles. Spikelets 2-flowered; lower flower staminate, upper perfect; rachilla extended beyond the flowers. Scales 4, the 2 lower empty, thin-membranous, keeled, very acute or awn-pointed, unequal, persistent, flowering scales rigid, 5–7-nerved, deciduous, the first bearing a long bent and twisted dorsal awn, inserted below the middle, the second unawned; palet hyaline, 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain ovoid, free. [Greek, referring to the awn of the staminate scale.]

Six species, natives of the Old World.

1. Arrhenatherum elàtius (L.) Beauv. Oat-grass. (Fig. 396.)

Avena elatior L. Sp. Pl. 79. 1753.
Arrhenatherum avenaceum Beauv. Agrost. 152. Name only. 1812.
Arrhenatherum elatius Beauv.; M. & K. Deutsch. Fl. 1: 546. 1823.

Glabrous, culms 2°–4° tall, erect, simple. Lower sheaths longer than the internodes; ligule 1″ long; leaves 2½′–12′ long, 1″–4″ wide, scabrous; panicle 4′–12′ in length, contracted, the branches erect, the lower 1′–2′ long; empty scales finely roughened, the second 4″ long, the first shorter; flowering scales about 4″ long.

In fields and waste places, Maine and Ontario to Georgia and Tennessee. Also on the Pacific Coast. Naturalized from Europe. June–Aug.

46. DANTHÒNIA DC. Fl. France, 3: 32. 1805.

Mostly perennial grasses, with flat or convolute leaves and contracted or open panicles. Spikelets 3–many-flowered, the flowers all perfect, or the upper staminate; rachilla pubescent, extending beyond the flowers. Scales 5–many, the 2 lower empty, keeled, acute, subequal, persistent, generally extending beyond the uppermost flowering one; flowering scales rounded on the back, 2-toothed, deciduous, the awn arising from between the acute or awned teeth, flat and twisted at base, bent; palet hyaline, 2-keeled near the margins, obtuse or 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Name in honor of Etienne Danthoine, a Marseilles botanist of the last century.]

A genus of about 100 species, widely distributed in warm and temperate regions, chiefly in South Africa.

Empty scales ½′ long or less; sheaths glabrous or sometimes sparingly pubescent at the base.
Teeth of the flowering scale about ½″ long, acute; culm leaves short; panicle contracted. 1. *D. spicata.*
Teeth of the flowering scale 1″–1½″ long, awned; culm leaves elongated; panicle usually open. 2. *D. compressa.*
Empty scales more than ½′ long; sheaths usually villous. 3. *D. sericea.*

1. Danthonia spicàta (L.) Beauv. Common Wild Oat-grass. (Fig. 397.)

Avena spicata L. Sp. Pl. 80. 1753.
Danthonia spicata Beauv.; R. & S. Syst. 2: 690. 1817.

Culms 1°–2½° tall, erect, simple, smooth and glabrous, nearly terete. Sheaths shorter than the internodes, glabrous or often sparingly pubescent below; ligule very short; leaves rough, 1″ wide or less, usually involute, the lower 4′–6′ long, the upper 1′–2′ long; inflorescence racemose or paniculate, 1′–2′ in length, the pedicels and branches erect or ascending; spikelets 5–8-flowered; empty scales 4″–5″ long, glabrous; flowering scales broadly oblong, sparingly pubescent with appressed silky hairs, the teeth about ½″ long, acute or short-pointed, the bent and widely spreading awn closely twisted at the base, loosely so above.

In dry soil, Newfoundland to Quebec and Dakota, south to North Carolina and Louisiana. Ascends to 3000 ft. in Virginia. July–Sept.

2. Danthonia compréssa Austin. Flattened Wild Oat-grass. (Fig. 398.)

Danthonia compressa Austin; Peck, Rept. Reg. N. Y. State Univ. 22: 54. 1869.

Danthonia Alleni Austin, Bull. Torr. Club, 3: 21. 1872.

Culms 1½°–3° tall, erect, slender, simple, flattened, smooth and glabrous. Sheaths shorter than the internodes; ligule pilose; leaves 1″ wide or less, rough, lax, the basal from one-third to one-half the length of the culm; lower culm leaves 6′–8′ long, the upper 3′–6′; panicle open, 2½′–4′ in length, the lower branches generally spreading; spikelets 5–10-flowered; empty scales 5″–6″ long, glabrous; flowering scales oblong, with a ring of short hairs at base, pubescent with appressed silky hairs, the awn erect or somewhat bent, strongly twisted below, slightly so above, the teeth 1″–1½″ long, acuminate, awned.

In woods, Maine and Vermont to North Carolina and Tennessee. Ascends to 6000 ft. in North Carolina. July–Sept.

3. Danthonia serícea Nutt. Silky Wild Oat-grass. (Fig. 399.)

Danthonia sericea Nutt. Gen. 1: 71. 1818.

Culms 1½°–3° tall, simple, glabrous. Sheaths shorter than the internodes, usually villous; ligule pilose; leaves rough and more or less villous, 1″–1½″ wide, the basal one-quarter to one-half the length of the culm, usually flexuous, those of the culm 1′–4′ long, erect; panicle 2½′–4½′ in length, contracted, the branches erect or ascending; spikelets 4–10-flowered; empty scales 7″–8″ long, glabrous; flowering scales oblong, strongly pubescent with long silky hairs, the awn erect or somewhat bent, closely twisted below, loosely so above, the teeth 1″–1½″ long, acuminate, awned.

In dry sandy soil, Massachusetts to New Jersey, south to Florida. May–July.

47. CAPRÌOLA Adans. Fam. Pl. 2: 31. 1763.

[Cynodon Rich.; Pers. Syn. 1: 85. 1805.]

Perennial grasses with short flat leaves and spicate inflorescence, the spikes digitate. Spikelets 1-flowered, secund. Scales 3; the 2 lower empty, keeled; flowering scale broader, membranous, compressed; palet a little shorter than the scale, hyaline, 2-keeled. Stamens 3. Styles distinct. Stigmas short, plumose. Grain free. [Name mediaeval Latin for the wild goat, that feeds on this grass in waste rocky places.]

Four known species, of which three are Australian, the following widely distributed.

1. Capriola Dáctylon (L.) Kuntze. Bermuda-grass. Scutch-grass. Dog's-tooth Grass. (Fig. 400.)

Panicum Dactylon L. Sp. Pl. 58. 1753.
Cynodon Dactylon Pers. Syn. 1: 85. 1805.
Capriola Dactylon Kuntze, Rev. Gen. Pl. 764. 1891.

Culms 4′–12′ tall, erect, from long creeping and branching stolons, smooth and glabrous. Sheaths glabrous or somewhat hairy, crowded at the bases of the culms and along the stolons; ligule pilose; leaves 1′–2′ long, 1″–2″ wide, flat, rigid, smooth beneath, scabrous above; spikes 4–5, ½′–2′ in length, digitate; rachis flat; spikelets 1″ long; outer scales hispid on the keel, narrow, the first shorter than the second, about two-thirds as long as the broad and strongly compressed third one.

In fields and waste places, southern New York to Pennsylvania and Tennessee, south to Florida and Texas. Abundant in the Southern States. Cultivated for pasture. Naturalized from Europe. July–Sept.

48. SPARTÌNA Schreb. Gen. 43. 1789.

Perennial glabrous grasses, with long horizontal rootstocks, flat or involute leaves, and an inflorescence of one-sided spreading or erect alternate spikes. Spikelets 1-flowered, narrow, deciduous, borne in two rows on the rachis, articulated with the very short pedicels below the scales. Scales 3; the 2 outer empty, keeled, very unequal; the third subtending a perfect flower, keeled, equalling or shorter than the second; palet often longer than its scale, 2-nerved. Stamens 3. Styles filiform, elongated. Stigmas filiform, papillose or shortly plumose. Grain free. [Greek, referring to the cord-like leaves of some species.]

About 7 species, widely distributed in saline soil, a few in fresh-water marshes.

First scale awn-pointed, equalling the third; second long-awned. — 1. *S. cynosuroides.*
First scale acute, shorter than the third, usually one-half as long.
  First scale strongly scabrous-hispid on the keel.
    Leaves ½′ wide or more, flat. — 2. *S. polystachya.*
    Leaves ¼′ wide or less.
      Spikes ascending or erect; leaves narrow, involute; coast plant. — 3. *S. patens.*
      Spikes appressed; leaves usually flat at the base; western species. — 4. *S. gracilis.*
  First scale smooth on the keel or occasionally slightly scabrous. — 5. *S. stricta.*

1. Spartina cynosuroides (L.) Willd. Tall Marsh-grass. (Fig. 401.)

Dactylis cynosuroides L. Sp. Pl. 71. 1753.
Spartina cynosuroides Willd. Enum. 80. 1809.

Culms 2°–6° tall, erect, simple, smooth. Sheaths long, overlapping, those at the base of the culm crowded; ligule a ring of hairs; leaves 1° long or more, 3″–7″ wide, scabrous on the margins, becoming involute in drying, attenuate into a long slender tip; spikes 5–30, 2′–5′ long, often on peduncles ½′–1′ in length, ascending or erect; rachis rough on the margins; spikelets much imbricated, 6″–7″ long; outer scales awn-pointed or awned, strongly hispid-scabrous on the keel; third scale as long as the first, the scabrous midrib terminating just below the emarginate or 2-toothed apex; palet sometimes exceeding the scale.

In swamps and streams of fresh or brackish water, Nova Scotia to Assiniboia, New Jersey and Texas. Sometimes glaucous. Called also Fresh-water Cord-grass. Aug.–Oct.

2. Spartina polystàchya (Michx.) Ell. Salt Reed-grass. (Fig. 402.)

Trachynotia polystachya Michx. Fl. Bor. Am. 1: 64. 1803.

Spartina polystachya Ell. Bot. S. C. & Ga. 1: 95. 1817.

Culms 4°–9° tall, erect, stout, simple, smooth. Sheaths overlapping, those at the base of the culm crowded; ligule a ring of hairs; leaves 1° long or more, ½′–1′ wide, flat, scabrous at least on the margins, attenuate into a long slender tip; spikes 20–50, ascending, often long-peduncled, 2′–4′ in length, the rachis rough on the margins; spikelets much imbricated, 4″–5″ long, the outer scales acute, strongly scabrous-hispid on the keel, the first half the length of the second; third scale scabrous on the upper part of the keel, obtuse, longer than the first and exceeded by the palet.

In salt and brackish marshes, Maine to New Jersey and Florida. Called also Creek-thatch. Aug.–Oct.

3. Spartina pàtens (Ait.) Muhl. Salt-meadow Grass. (Fig. 403.)

Dactylis patens Ait. Hort. Kew. 1: 104. 1789.
Spartina patens Muhl. Gram. 55. 1817.
Spartina juncea Ell. Bot. S. C. & Ga. 1: 94. 1817.

Culms 1°–3° tall, erect, or decumbent at base, smooth. Lower sheaths overlapping and crowded; ligule a ring of short hairs; leaves ½°–1° long, 1″–2″ broad, involute, attenuate into a long tip, smooth and glabrous beneath; spikes 2–10, 1′–2′ long, usually ascending, more or less peduncled, the rachis slightly scabrous; spikelets 3″–4″ long; outer scales acute, scabrous-hispid on the keel, the first usually rather less than one-half as long as the second; third scale somewhat scabrous on the upper part of the keel, emarginate or 2-toothed at the apex, longer than the first and exceeded by the palet.

On salt meadows, Newfoundland and Nova Scotia to Florida, west to Texas. This and *Juncus Gerardi*, the "Black Grass," furnish most of the salt meadow hay of the Atlantic coast. Aug.–Oct.

4. Spartina grácilis Trin. Inland Cord-grass. (Fig. 404.)

Spartina gracilis Trin. Mem. Acad. St. Petersb. (VI.) 6: 110. 1840.

Culms 1°–3° tall, erect, simple, smooth. Sheaths overlapping, those at the base of the culm short and crowded; ligule a ring of short hairs; leaves 1° long or less, 1″–3″ wide, flat or involute, attenuate into a long tip; spikes 4–8, 1′–2′ long, appressed, more or less peduncled; spikelets 3″–4″ long; outer scales acute, scabrous-hispid on the keel, the first half the length of the second; third scale obtuse, slightly shorter than the second and about equalling the obtuse palet.

In saline soil, Assiniboia and British Columbia to Nebraska and Nevada. Aug.–Sept.

5. Spartina stricta (Ait.) Roth. Smooth Marsh-grass. (Fig. 405.)

Dactylis stricta Ait. Hort. Kew. 1: 104. 1789.
Spartina stricta Roth, Cat. Bot. 3: 9. 1806.

Culms 1°–3° tall, erect, simple, smooth. Sheaths overlapping, those at the base shorter and looser, much crowded; ligule a ring of short hairs; leaves 3′–12′ long, 2″–4″ wide at the base, involute, at least when dry; spikes 3–5, erect or nearly so, 1′–2′ long; spikelets 6″–8″ long, loosely imbricated; empty scales acute or acutish, 1-nerved, the first shorter than the second, which exceeds or equals the third; palet longer than the third scale.

Spartina stricta maritima (Walt.) Scribn. Mem. Torr. Club, 5: 45. 1894.

Dactylis maritima Walt. Fl. Car. 77. 1788.
Spartina glabra Muhl. Gram. 54. 1817.

Culms taller, sometimes 9° high, and leaves longer; spikes more numerous, usually appressed.

Spartina stricta alterniflòra (Lois.) A. Gray, Man. Ed. 2, 552. 1856.

Spartina alterniflora Lois. Fl. Gall. 2: 719. 1807.

Culms 4°–6° tall; spikes slender, appressed, 3′–5′ long, the spikelets barely overlapping.

Very variable. Common, in some one of its forms, along the coast from Maine to Florida and Texas. Also on the coast of Europe. Our plant does not appear to be satisfactorily identified with the European. Aug.–Oct.

49. CAMPULÒSUS Desv. Bull. Soc. Philom. 2: 189. 1810.

[Ctenium Panzer, Deutsch. Akad. Muench. 1813: 288. *pl. 13.* 1814.]

Tall pungent-tasted grasses, with flat or convolute narrow leaves and a curved spicate inflorescence. Spikelets borne pectinately in two rows on one side of the flat curved rachis, 1-flowered. Lower 4 scales empty, the first very short, hyaline; the second, third, fourth and fifth awned on the back, the latter subtending a perfect flower and palet, the uppermost scales empty. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, loosely enclosed in the scale. [Greek, in allusion to the curved spike.]

Seven known species, four of them American, the others in the eastern hemisphere.

1. Campulosus aromáticus (Walt.) Scribn. Toothache Grass. (Fig. 406.)

Aegilops aromatica Walt. Fl. Car. 249. 1788.

Ctenium Americanum Spreng. Syst. 1: 274. 1825.

Campulosus aromaticus Scribn. Mem. Torr. Club, 5: 45. 1894.

Culms 3°–4° tall, erect, simple, smooth or somewhat scabrous. Sheaths shorter than the internodes, rough; ligule 1″ long, truncate; leaves 1′–6′ long, 1″–2″ wide, flat or involute, smooth; spike terminal, solitary, curved, 2′–4′ long, the rachis extended into a point; spikelets about 3″ long; second scale thick and rigid, awn-pointed, bearing just above the middle a stout horizontal or recurved awn; third, fourth and fifth scales membranous, scabrous, awned from below the 2-toothed apex, the fifth subtending a perfect flower, the others empty.

In wet soil, especially in pine barrens, Virginia to Florida. July–Sept.

50. CHLÒRIS Sw. Prodr. 25. 1788.

Mostly perennial grasses with flat leaves and spicate inflorescence, the spikes solitary, few, or numerous and verticillate or approximate. Spikelets 1-flowered, arranged in two rows on one side of the rachis. Scales 4; the 2 lower empty, unequal, keeled, acute; third and fourth usually awned, the former subtending a perfect flower; palet folded and 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Greek, greenish-yellow, referring to the color of the herbage.]

About forty species, mostly natives of warm and tropical regions. Besides the following some 10 others occur in the southern United States.

1. Chloris verticillàta Nutt. Prairie Chloris. (Fig. 407.)

Chloris verticillata Nutt. Trans. Am. Phil. Soc. (II.) 5: 150. 1833–37.

Culms 6′–18′ tall, erect, or decumbent and rooting at the lower nodes, smooth, glabrous. Sheaths shorter than the internodes, smooth, or roughish at the summit; ligule a ring of short hairs; leaves 1′–3′ long, 1″–2″ wide, obtuse, often apiculate, scabrous; spikes slender, usually spreading, 2′–4½′ long, in one or two whorls, or the upper ones approximate; spikelets, exclusive of the awns, about 1½″ long, the first scale about one-half the length of the second; the third 1″ long, obtuse, ciliate on the nerves, especially on the lateral ones, bearing just below the apex a scabrous awn about 2½″ long; fourth scale as long as or shorter than the third, awned near the usually truncate apex.

On prairies, Kansas to Texas. May-July.

51. GYMNOPÒGON Beauv. Agrost. 41. *pl. 9. f. 3.* 1812.

Perennial grasses with flat and usually short rigid leaves, and numerous slender alternate spikes. Spikelets 1-flowered, almost sessile, the rachilla extended and bearing a small scale which is usually awned. Scales 3 or 4; the 2 lower empty, unequal, narrow, acute; third broader, fertile, 3-nerved, slightly 2-toothed at the apex, bearing an erect awn; the fourth empty, small, awned; palet 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain linear, free, enclosed in the rigid scale. [Greek, naked-beard, referring to the prolongation of the rachilla.]

Six known species, all but one of them natives of America.

Spikes bearing spikelets their whole length; awn longer than flowering scale. 1. *G. ambiguus.*
Spikes bearing spikelets above the middle; awn shorter than flowering scale. 2. *G. brevifolius.*

1. Gymnopogon ambíguus (Michx.) B.S.P. Broad-leaved Gymnopogon. (Fig. 408.)

Andropogon ambiguus Michx. Fl. Bor. Am. 1: 58. 1803.
Gymnopogon racemosus Beauv. Agrost. 164. 1812.
Gymnopogon ambiguus B.S.P. Prel. Cat. N. Y. 69. 1888.

Culms 12′–18′ tall, erect, or decumbent at the base, simple or sometimes sparingly branched, smooth and glabrous. Sheaths short, glabrous, excepting a villous ring at the summit, crowded at the base of the culm; ligule very short; leaves 1′–4′ long, 2″–6″ wide, lanceolate, acute, cordate at the base, spreading, smooth or a little scabrous above; spikes slender, spikelet-bearing throughout their entire length, at first erect, the lower 4′–8′ long, at length widely spreading; spikelets, exclusive of awns, 2″–2½″ long; first scale shorter than the second; third scale exceeded by the second, the callus at the base hairy, the awn 2″–3″ long.

In dry sandy soil, southern New Jersey to Missouri, south to Florida and Texas. Aug.–Oct.

2. Gymnopogon brevifòlius Trin. Short-leaved Gymnopogon. (Fig. 409.)

Gymnopogon brevifolius Trin. Unifl. 238. 1824.

Culms 1°–2° long, from a decumbent base, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, sometimes crowded near the middle of the culm; ligule very short; leaves 1′–2′ long, 1″–4″ wide, usually spreading, lanceolate, acute, cordate at the base; spikes very slender, spikelet-bearing above the middle, the lower 4′–6′ long, at first erect, finally widely spreading; spikelets, exclusive of the awns, 1½″ long; first scale shorter than the second; third scale equalling or exceeded by the second, short-awned, sparingly villous or glabrous, the calluses hairy.

In dry soil, New Jersey to Florida, west to Mississippi. Aug.–Oct.

52. SCHEDONNÀRDUS Steud. Syn. Pl. Gram. 146. 1855.

An annual grass with branching culms, narrow leaves and slender spikes arranged along a common axis. Spikelets 1-flowered, sessile and alternate on the rachis. Scales 3; the 2 lower empty, narrow, membranous, acuminate; the flowering scale longer, of similar texture; palet narrow, shorter. Stamens 3. Styles distinct. Stigmas plumose. Grain linear, free, enclosed in the rigid scale. [Greek, in allusion to the resemblance of this grass to the genus *Nardus*.]

A monotypic genus of central North America.

1. Schedonnardus paniculàtus (Nutt.) Trelease. Schedonnardus. (Fig. 410.)

Lepturus paniculatus Nutt. Gen. 1: 81. 1818.
Schedonnardus Texanus Steud. Syn. Pl. Gram. 146. 1855.
Schedonnardus paniculatus Trelease, Branner & Coville, Rep. Geol. Surv. Ark. 1888: Part 4, 236. 1891.

Culms 8′–18′ tall, erect, slender, rigid, branching at the base, scabrous. Sheaths crowded at the base of the culm, compressed, smooth and glabrous; ligule 1″ long, truncate; leaves 1′–2′ long, 1″ wide or less, flat, usually erect; spikes numerous, rigid, widely spreading, alternate, the lower 2′–4′ long, the axis and branches triangular; spikelets 1¼″–1½″ long, sessile and appressed, alternate; scales hispid on the keel, the second longer than the first and exceeded by the acute third one.

Manitoba and Assiniboia, south to Illinois, Texas and New Mexico. July–Sept.

53. BOUTELOÙA Lag. Var. Cienc. y Litter. 2: Part 4, 134. 1805.

Annual or perennial grasses with flat or convolute leaves and numerous spikelets in one-sided spikes. Spikelets 1–2-flowered, arranged in two rows on one side of a flat rachis, the rachilla extended beyond the base of the flowers, bearing 1–3 awns and 1–3 rudimentary scales. Two lower scales empty, acute, keeled; flowering scale broader, 3-toothed, the teeth awn-pointed or awned; palet hyaline, entire or 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free. [In honor of Claudius Boutelou, a Spanish botanist.]

About 30 species, particularly numerous in Mexico and in the southwestern United States.

Spikes 1–4, erect or spreading; spikelets numerous, pectinately arranged.
- Rachilla bearing the rudimentary scales and awns glabrous; second scale strongly papillose-hispid on the keel. 1. *B. hirsuta*.
- Rachilla bearing the rudimentary scales and awns with a tuft of long hairs at the apex; second scale scabrous and sparingly long-ciliate on the keel. 2. *B. oligostachya*.

Spikes numerous, spreading or reflexed; spikelets few or several, diverging from the rachis. 3. *B. curtipendula*.

1. Bouteloua hirsùta Lag. Hairy Mesquite-grass. (Fig. 411.)

Bouteloua hirsuta Lag. Var. Cienc. y Litter. 2: Part 4, 141. 1805.

Culms 6′–20′ tall, erect, simple or sometimes sparingly branched at the base, smooth and glabrous. Sheaths mostly at the base of the culm, the lower short and crowded, the upper longer; ligule a ring of short hairs; leaves 1′–5′ long, 1″ wide or less, erect or ascending, flat, scabrous, sparingly papillose-hirsute near the base, especially on the margins; spikes 1–4, ½′–2′ long, usually erect or ascending, the rachis extending beyond the spikelets into a conspicuous point; spikelets numerous, 2½″–3″ long, pectinately arranged; first scale hyaline, shorter than the membranous second one, which is strongly papillose-hirsute on the keel; third scale pubescent, 3-cleft to the middle, the nerves terminating in awns; rachilla without a tuft of hairs under the rudimentary scales and awns.

In dry soil, especially on prairies, Illinois to Dakota, Texas and Arizona. July–Sept.

2. Bouteloua oligostàchya (Nutt.) Torr. Grama-grass. Mesquite-grass. (Fig. 412.)

Atheropogon oligostachyus Nutt. Gen. 1: 78. 1818.
Bouteloua oligostachya Torr.; A. Gray, Man. Ed. 2, 553. 1856.

Culms 6′–18′ tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 1′–4′ long, 1″ wide or less, involute, at least at the long slender tip, smooth or scabrous; spikes 1–3, 1′–2′ long, often strongly curved, the rachis terminating in a short inconspicuous point; spikelets numerous, pectinately arranged, about 3″ long; first scale hyaline, shorter than the membranous second one, which is scabrous and sometimes long-ciliate on the keel, and sometimes bears a few papillae; third scale pubescent, 3-cleft, the nerves terminating in awns; rachilla with a tuft of long hairs under the rudimentary scales and awns.

On prairies, Manitoba to Alberta, south to Wisconsin, Texas and Mexico. July–Sept.

3. Bouteloua curtipéndula (Michx.) Torr. Racemed Bouteloua. (Fig. 413.)

Chloris curtipendula Michx. Fl. Bor. Am. 1: 59. 1803.
Bouteloua racemosa Lag. Var. Cienc. y Litter. 2: Part 4, 141. 1805.
Bouteloua curtipendula Torr. Emory's Rep. 153. 1848.
Bouteloua curtipendula var. *aristosa* A. Gray, Man. Ed. 2, 553. 1856.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 2′–12′ long, 2″ wide or less, flat or involute, rough, especially above; spikes numerous, 3″–8″ long, widely spreading or reflexed; spikelets 4–12, divergent from the rachis, 3½″–5″ long, scales scabrous, especially on the keel, the first shorter than or equalling the second; the third 3-toothed, the nerves extended into short awns; rachilla bearing at the summit a small awned scale, or sometimes a larger 3-nerved scale, the nerves extended into awns; anthers vermillion or cinnabar-red.

In dry soil, Ontario to Manitoba, south to New Jersey, Kentucky, Texas and Mexico. July–Sept.

54. BECKMÁNNIA Host, Gram. Austr. 3: 5. *pl. 6.* 1805.

A tall erect grass with flat leaves and erect spikes borne in a terminal panicle. Spikelets 1–2-flowered, globose, compressed. Scales 3 or 4; the 2 lower empty, membranous, saccate, obtuse or abruptly acute; the flowering scales narrow, thin membranous; palet hyaline, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale and palet. [In honor of Johann Beckmann, 1739–1811, teacher of Natural History at St. Petersburg.]

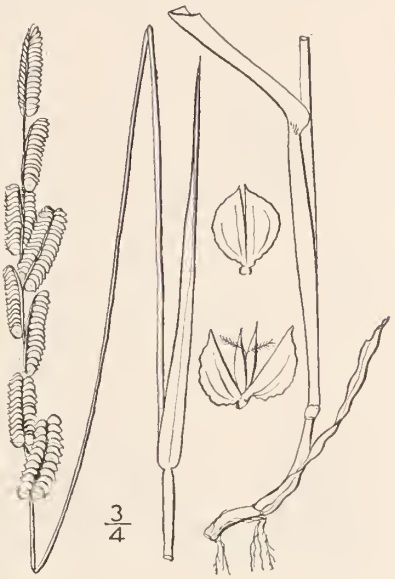
A monotypic genus of the north temperate zone.

1. Beckmannia erucaefórmis (L.) Host. Beckmannia. (Fig. 414.)

Phalaris erucaeformis L. Sp. Pl. 55. 1753.
Beckmannia erucaeformis Host, Gram. Austr. 3: 5. 1805.
Beckmannia erucaeformis var. *uniflora* Scribn.; Wats. & Coult. in A. Gray, Man. Ed. 6, 628. 1890.

Glabrous, culms 1½°–3° tall, erect, simple, smooth. Sheaths longer than the internodes, loose; ligule 2″–4″ long; leaves 3′–9′ long, 2″–4″ wide, rough; panicle 4′–10′ in length, simple or compound, the spikes about ½′ long; spikelets 1″–1½″ long, 1–2-flowered, closely imbricated in two rows on one side of the rachis; scales smooth, the outer saccate, obtuse or abruptly acute; flowering scales acute, the lower generally awn-pointed, the upper rarely present.

In wet places, western Ontario to British Columbia, south to Iowa, Colorado and California. July–Sept.



55. ELEUSÌNE Gaertn. Fruct. & Sem. 1: 7. *pl. 1.* 1788.

Tufted annual or perennial grasses, with flat leaves and spicate inflorescence, the spikes digitate or close together at the summit of the culm. Spikelets several-flowered, sessile, closely imbricated in two rows on one side of the rachis, which is not extended beyond them; flowers perfect or the upper staminate. Scales compressed, keeled; the 2 lower empty; the others subtending flowers, or the upper empty. Stamens 3. Styles distinct. Stigmas plumose. Grain loosely enclosed in the scale and palet. [From the Greek name of the town where Ceres was worshipped.]

Species 6, natives of the Old World. Besides the following, two others have been found in ballast fillings about the eastern seaports.

1. Eleusine Índica (L.) Gaertn. Wire-grass. Crab-grass. Yard-grass. (Fig. 415.)

Cynosurus Indicus L. Sp. Pl. 72. 1753.
Eleusine Indica Gaertn. Fruct. & Sem. 1: 8. 1788.

Culms 6′–2° tall, tufted, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, overlapping and often short and crowded at the base of the culm, glabrous or sometimes sparingly villous; ligule very short; leaves 3′–12′ long, 1″–3″ wide, smooth or scabrous; spikes 2–10, 1′–3′ long, whorled or approximate at the summit of the culm or one or two sometimes distant; spikelets 3–6-flowered, 1½″–2″ long; scales acute, minutely scabrous on the keel, the first 1-nerved, the second 3–7-nerved, the others 3–5-nerved.

In fields, dooryards and waste places all over North America except the extreme north. Naturalized from the warmer regions of the Old World. June–Sept.

56. DACTYLOCTÈNIUM Willd. Enum. 1029. 1809.

An annual grass with flat leaves and spicate inflorescence, the spikes in pairs or digitate. Spikelets several-flowered, sessile, closely imbricated in two rows on one side of the rachis which is extended beyond them into a sharp point. Scales compressed, keeled, the 2 lower and the uppermost ones empty, the others subtending flowers. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, rugose, loosely enclosed in the scale. [Greek, referring to the digitately spreading spikes.]

A monotypic genus of the warmer parts of the Old World.

1. Dactyloctenium Aegýptium (L.) Willd. Egyptian Grass. (Fig. 416.)

Cynosurus Aegyptius L. Sp. Pl. 72. 1753.

Eleusine Aegyptia Pers. Syn. 1: 87. 1805.

Dactyloctenium Aegyptiacum Willd. Enum. 1029. 1809.

Culms 6′–2° long, usually decumbent and extensively creeping at the base. Sheaths loose, overlapping and often crowded, smooth and glabrous; ligule very short; leaves 6′ in length or less, 1″–3″ wide, smooth or rough, sometimes pubescent, ciliate toward the base; spikes in pairs, or 3–5 and digitate, ½′–2′ long; spikelets 3–5-flowered; scales compressed, scabrous on the keel, the second awned, the flowering ones broader and pointed.

In waste places and cultivated ground, southern New York, Pennsylvania and Virginia to Illinois and California, south to Florida and Mexico. Widely distributed in tropical America. Naturalized from Asia or Africa. July–Oct.

57. LEPTÓCHLOA Beauv. Agrost. 71. *pl. 15. f. 1.* 1812.

Usually tall annual grasses, with flat leaves and numerous spikes forming a simple panicle. Spikelets usually 2–many-flowered, flattened, alternating in two rows on one side of the rachis. Scales 4–many; the 2 lower empty, keeled, shorter than the spikelet; the flowering scales keeled, 3-nerved. Palet 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Greek, in allusion to the slender spikes.]

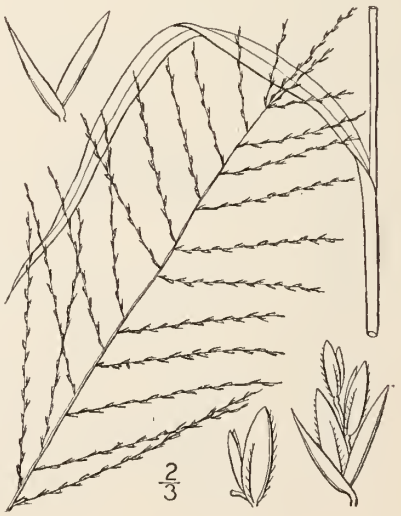
About 12 species, natives of the warmer regions of both hemispheres. Besides the following, 3 others occur in the southern United States.

1. Leptochloa mucronàta (Michx.) Kunth. Northern Leptochloa. (Fig. 417.)

Eleusine mucronata Michx. Fl. Bor. Am. 1: 65. 1803.
Leptochloa mucronata Kunth, Gram. 1: 91. 1829–35.

Culms 1°–3° tall, erect, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth and glabrous; ligule short, lacerate-toothed; leaves 2′–8′ long, 1″–3″ wide, scabrous; spikes numerous, slender, rigid, spreading or ascending, the lower 2′–6′ long; spikelets usually 3-flowered, about 1″ long, the empty scales shorter than the spikelet, acute, 1-nerved, slightly scabrous on the keel; flowering scales 2-toothed at the apex, ciliate on the nerves.

In dry or moist soil, Virginia to Illinois, Missouri and California, south to North Carolina, Louisiana and Mexico. Also in Cuba. July–Sept.



58. BÚLBILIS Raf. Am. Month. Mag. 4: 190. 1819.

[Buchloë Engelm. Trans. St. Louis Acad. 1: 432. *pl. 14. figs. 1–17.* 1859.]

A perennial stoloniferous monoecious or apparently dioecious grass with flat leaves and spicate inflorescence. Staminate spikelets borne in two rows on one side of the rachis, the spikes at the summit of the long and exserted culms. Pistillate spikelets in spike-like clusters of 2 or 3, on very short culms, scarcely exserted from the sheath. Stamens 3. Styles distinct, long. Stigmas elongated, short-plumose. Grain ovate, free, enclosed in the scale. [Name apparently from the supposed bulb-like base of old plants.]

A monotypic genus of central North America.

1. Bulbilis dactyloìdes (Nutt.) Raf. Buffalo Grass. (Fig. 418.)

Sesleria dactyloides Nutt. Gen. 1: 65. 1818.
Buchloë dactyloides Engelm. Trans. St. Louis Acad. 1: 432. 1859.
Bulbilis dactyloides Raf.; Kuntze, Rev. Gen. Pl. 763. 1891.

Culms bearing staminate flowers 4′–12′ tall, erect, slender, naked above, smooth and glabrous; those bearing pistillate flowers ½′–3′ long, much exceeded by the leaves; ligule a ring of short hairs; leaves 1″ wide or less, more or less papillose-hirsute, those of the staminate culms 1′–4′ long, erect, those of the stolons and pistillate culms 1′ long or less, spreading; staminate spikes 2 or 3, approximate; spikelets 2″–2½″ long, flattened, 2–3-flowered, the empty scales 1-nerved, the flowering 3-nerved; pistillate spikelets ovoid, the outer scales indurated.

On plains and prairies, Minnesota to Dakota, south to Arkansas, Texas and Mexico. A valuable fodder grass. June–July.

59. MUNRÒA Torr. Pac. R. R. Rept. 4: 158. 1856.

A low diffusely branched grass, with flat pungently pointed leaves crowded at the nodes and the ends of the branches. Spikelets in clusters of 3–6, nearly sessile in the axils of the floral leaves, 2–5-flowered, the flowers perfect. Two lower scales empty, lanceolate, acute, 1-nerved, hyaline; flowering scales larger, 3-nerved; 1 or 2 empty scales sometimes present above the flowering ones; palet hyaline. Stamens 3. Styles distinct, elongated. Stigmas barbellate or short-plumose. Grain free, enclosed in the scale and palet. [In honor of Gen. William Munro, English agrostologist.]

Three known species, the following of the plains of North America, the others South American.

1. Munroa squarròsa (Nutt.) Torr. Munro's Grass. (Fig. 419.)

Crypsis squarrosa Nutt. Gen. 1: 49. 1818.
Munroa squarrosa Torr. Pac. R. R. Rept. 4: 158. 1856.

Culms 2′–8′ long, tufted, erect, decumbent or prostrate, much branched, smooth or rough. Sheaths short, crowded at the nodes and ends of the branches, smooth, pilose at the base and throat, sometimes ciliate on the margins; ligule a ring of hairs; leaves 1′ long or less, ½″–1′ wide, rigid, spreading, scabrous, pungently-pointed; spikelets 2–5-flowered, the flowers perfect; empty scales 1-nerved, shorter than the flowering scales which are about 2½″ long, 3-toothed, the nerves excurrent as short points or awns, tufts of hairs near the middle; palets obtuse.

On dry plains, South Dakota to Alberta, south to Nebraska, Texas and Arizona. Aug.–Oct.

60. PHRAGMÌTES Trin. Fund. Agrost. 134. 1820.

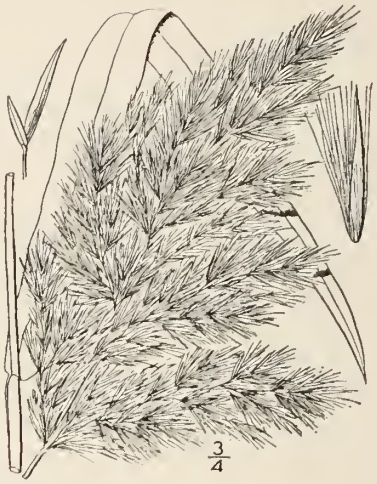
Tall perennial reed-like grasses, with broad flat leaves and ample panicles. Spikelets 3–several-flowered, the first flower often staminate, the others perfect; rachilla articulated between the flowering scales, long-pilose. Two lower scales empty, unequal, membranous, lanceolate, acute, shorter than the spikelet; the third scale empty or subtending a staminate flower; flowering scales glabrous, narrow, long-acuminate, much exceeding the short palets. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, referring to its hedge-like growth along ditches]

Three known species, the following of the north temperate zone, one in Asia, the third in South America.

1. Phragmites Phragmìtes (L.) Karst. Reed. (Fig. 420.)

Arundo Phragmites L. Sp. Pl. 81. 1753.
Phragmites communis Trin. Fund. Agrost. 134. 1820.
Phragmites Phragmites Karst. Deutsch. Fl. 379. 1880–83.

Culms 5°–15° tall, erect, stout, from long horizontal rootstocks, smooth and glabrous. Sheaths overlapping, loose; ligule a ring of very short hairs; leaves 6′–1° long or more, ½′–2′ wide, flat smooth, glabrous; panicle 6′–1° long or more, ample; spikelets crowded on the ascending branches; first scale 1-nerved, half to two-thirds as long as the 3-nerved second one; flowering scales 5″–6″ long, 3-nerved, long-acuminate, equalling the hairs of the rachilla.



In swamps and wet places nearly throughout the United States, extending north to Nova Scotia, Manitoba and British Columbia. Also in Europe and Asia. Rarely ripening seed. Aug.–Oct.

61. SIEGLÍNGIA Bernh. Syst. Verz. Pfl. Erf. 40. 1800.

[Triodia R. Br. Prodr. Fl. Nov. Holl. 1: 182. 1810.]

Perennial grasses with narrow leaves and contracted or open panicles. Spikelets 2–many-flowered, the flowers perfect or the upper staminate. Scales 5–many, rigid, 1–3-nerved; the 2 lower empty, shorter than the spikelet, keeled; flowering scales rounded on the back, at least at the base, the apex lobed or toothed, 3-nerved, the nerves pilose, and usually excurrent as short points between the lobes or teeth; palet broad, 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name in honor of Professor Siegling, Germau botanist.]

About 30 species, widely distributed in temperate regions; a few in tropical America. Besides the following, some 20 others occur in the southern and western parts of North America.

Internodes of the rachilla less than one-quarter the length of the flowering scales.
- Panicle open, the branches 4′–10′ long. 1. *S. seslerioides.*
- Panicle spike-like, the branches 3′ long or less.
  - Panicle 5′–12′ long; spikelets numerous. 2. *S. stricta.*
  - Panicle 1′–2′ long; spikelets few. 3. *S. decumbens.*

Internodes of the rachilla one-half the length of the flowering scales. 4. *S. purpurea.*

1. Sieglingia seslerioìdes (Michx.) Scribn. Tall Red-top. (Fig. 421.)

Poa seslerioides Michx. Fl. Bor. Am. 1: 68. 1803.
Triodia cuprea J. F. Jacq. Eclog. Gram. 2: 21. *pl. 16.* 1814.
Sieglingia seslerioides Scribn. Mem. Torr. Bot. Club, 5: 48. 1894.

Culms 2°–5° tall, erect, somewhat flattened, simple, glabrous, often viscid above. Sheaths sometimes villous at the summit, the lower short, overlapping and crowded, the upper longer, equalling or shorter than the internodes; ligule a ring of very short hairs; leaves 4′–1° long or more, 3″–6″ wide, flat, attenuate into a long tip, smooth beneath, scabrous above; panicle 6′–18′ long, the branches finally ascending or spreading, the lower 4′–10′ long, usually dividing above the middle; spikelets 4–8-flowered, 3″–4″ long, purple; joints of the rachilla short; empty scales glabrous, obtuse, generally slightly 2-toothed; flowering scales oval, the nerves pilose, excurrent as short points.

In fields, New York to Kansas, south to Florida and Texas. July–Sept.

2. Sieglingia stricta (Nutt.) Kuntze. Narrow Sieglingia. (Fig. 422.)

Windsoria stricta Nutt. Trans. Am. Phil. Soc. (II.) 5: 147. 1833–37.
Triodia stricta Vasey, Spec. Rept. U. S. Dept. Agric. 63: 35. 1883.
Sieglingia stricta Kuntze, Rev. Gen. Pl. 789. 1891.

Culms 1½°–4° tall, erect, a little compressed, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 6′–1° long or more, flat, long-acuminate, smooth beneath, scabrous above; spike-like panicle 5′–12′ in length, the branches appressed, the lower 1′–2′ long; spikelets 4–10-flowered, 2″–3″ long, the joints of the rachilla very short; lower scales usually about two-thirds as long as the spikelet, rarely extending beyond the flowering scales, acute, glabrous; flowering scales ovate, the nerves pilose for more than half their length, the middle and often the lateral excurrent as short points.

Moist soil, Mississippi to Kansas and Texas. July–Oct.

3. Sieglingia decúmbens (L.) Kuntze. Heather-grass. (Fig. 423.)

Festuca decumbens L. Sp. Pl. 75. 1753.
Triodia decumbens Beauv. Agrost. 76. 1812.
Sieglingia decumbens Kuntze, Rev. Gen. Pl. 789. 1891.

Culms 6′–18′ tall, erect, often decumbent at the base, simple, smooth and glabrous. Sheaths shorter than the internodes, villous at the summit; ligule a ring of very short hairs; leaves smooth beneath, usually scabrous above, ½″–1½″ wide, the basal 3′–6′ long, those of the culm 1′–3′ long; panicle 1′–2′ long, contracted, the branches 1′ long or less, erect; spikelets 3–5-flowered, 3″–5″ long, the joints of the rachilla very short; lower scales equalling the spikelet, acute; flowering scales broadly oval, ciliate on the margins below, obtusely 3-toothed, with two tufts of hair on the callus.

Introduced into Newfoundland. Native of Europe and Asia. Summer.

4. Sieglingia purpùrea (Walt.) Kuntze. Sand-grass. (Fig. 424.)

Aira purpurea Walt. Fl. Car. 78. 1788.
Tricuspis purpurea A. Gray, Man. 589. 1848.
Sieglingia purpurea Kuntze, Rev. Gen. Pl. 789. 1891.

Culms 1°–3° tall, erect, prostrate or decumbent, smooth and glabrous or the nodes pubescent. Sheaths shorter than the internodes, rough; ligule a ring of short hairs; leaves ½′–2½′ long, 1″ wide or less, rigid, scabrous, sometimes sparsely ciliate; panicle 1′–3′ in length, the branches rigid, finally widely spreading, the lower ¾′–1½′ long; spikelets 2–5-flowered, 2½″–4″ long, the joints of the rachilla half as long as the flowering scale; lower scales glabrous; flowering scales oblong, 2-lobed at the apex, the lobes erose-truncate, the nerves strongly ciliate, the middle one excurrent as a short point; palets long-ciliate on the upper part of the keel.

In sand, especially on sea beaches, Maine to Texas, and along the Great Lakes. Also from Nebraska to New Mexico. Plant acid. Aug.–Sept.

62. REDFIÈLDIA Vasey, Bull. Torr. Club, 14: 133. 1887.

A tall perennial grass, with long narrow leaves and an ample panicle. Spikelets 1–3-flowered, the flowers all perfect. Empty scales 2, about equal, shorter than the spikelet, 1-nerved; flowering scales membranous, 3-nerved, with a ring of hairs at the base. Palet 2-nerved, shorter than the scale. Stamens 3. Styles long, distinct. Stigmas short, plumose. Grain oblong, free. [In honor of John H. Redfield, 1815–1895, American naturalist.

A monotypic genus of the western United States.

1. Redfieldia flexuòsa (Thurb.) Vasey. Redfieldia. (Fig. 425.)

Graphephorum (?) *flexuosum* Thurb. Proc. Acad. Phila. 1863: 78. 1863.
Redfieldia flexuosa Vasey, Bull. Torr. Club, 14: 133. 1887.

Culms 1½°–4° tall, erect from a long horizontal rootstock, simple, smooth and glabrous. Sheaths smooth, the lower short and overlapping, often crowded, the upper much longer; ligule a ring of short hairs; leaves 1°–2° long, 1″–2″ wide, involute; panicle ample and diffuse, 8′–22′ in length, the branches finally widely spreading, flexuous, the lower 3′–8′ long; spikelets about 3″ long, 1–3-flowered, the empty scales acute, glabrous; flowering scales with a ring of hairs at the base, minutely scabrous, twice the length of the empty ones, acute, the middle nerve usually excurrent as a short point.

On prairies, Nebraska and Wyoming to Colorado and the Indian Territory. Aug.–Sept.

63. DIPLÁCHNE Beauv. Agrost. 80. *pl. 16. f. 9.* 1812.

Tufted grasses, with narrow flat leaves and long slender spikes arranged in an open panicle, or rarely only one terminal spike. Spikelets several-flowered, narrow, sessile or shortly pedicelled, erect. Two lower scales empty, membranous, keeled, acute, unequal; flowering scales 1–3-nerved, 2-toothed and mucronate or short-awned between the teeth. Palet hyaline, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, referring to the 2-toothed flowering scales.]

About 15 species, natives of the warmer regions of both hemispheres. Besides the following species, about 6 others occur in the southern and western parts of North America.

1. Diplachne fasciculàris (Lam.) Beauv. Salt-meadow Diplachne. (Fig. 426.)

Festuca fascicularis Lam. Tabl. Encycl. 1: 189. 1791.
Diplachne fascicularis Beauv. Agrost. 160. 1812.

Culms 1°–2½° tall, erect, ascending, or rooting at the lower nodes, simple or branched, smooth and glabrous. Sheaths shorter than the internodes, loose, smooth or rough, the upper one longer and enclosing the base of the panicle; ligule 1″–2″ long; leaves 3′–12′ long, 1″–3″ wide, slightly scabrous; panicle 4′–12′ in length, often exceeded by the upper leaf, the branches erect or ascending, the lower 2′–5′ long; spikelets 5–10-flowered, 3″–5″ long, short-pedicelled, erect; lower scales glabrous, rough on the keel; flowering scales scabrous, ciliate on the margins toward the base, 3-nerved.

In brackish marshes, Rhode Island to Florida and Texas. Also from Missouri and Nebraska to Mexico, and in the West Indies. Aug.–Oct.

64. MOLÍNIA Schrank, Baier. Fl. 1: 100. 1789.

A perennial tufted grass, with narrow flat leaves and paniculate inflorescence. Spikelets 2–4-flowered. Two lower scales empty, somewhat obtuse or acute, unequal, shorter than the spikelet; flowering scales membranous, rounded on the back, 3-nerved; palets scarcely shorter than the scales, obtuse, 2-keeled. Stamens 3. Styles short. Stigmas short, plumose. Grain oblong, free, enclosed in the scale and palet. [Name in honor of Joh. Ignaz Molina, Chilian missionary and naturalist.]

A monotypic genus of Europe and Asia.

1. Molinia coerùlea (L.) Moench. Molinia. (Fig. 427.)

Aira coerulea L. Sp. Pl. 63. 1753.
Molinia coerulea Moench, Meth. 183. 1794.

Culms 1°–3½° tall, erect, simple, smooth and glabrous. Sheaths overlapping and confined to the lower part of the culm, smooth and glabrous; ligule a ring of very short hairs; leaves 4′–1° long or more, 1″–3″ wide, erect, acuminate, smooth beneath, slightly scabrous above; panicle 3′–10′ in length, green or purple, the branches usually erect, 1′–4′ long; spikelets 2–4-flowered, 2½″–4″ long; empty scales acute, unequal; flowering scales about 2″ long, 3-nerved, obtuse.

Sparingly introduced on ballast and in waste places in New York. Adventive from Europe. Aug.–Sept.

65. ERAGRÓSTIS Beauv. Agrost. 70. *pl. 14. f. 11.* 1812.

Annual or perennial grasses, rarely dioecious, from a few inches to several feet in height, the spikelets in contracted or open panicles. Spikelets 2–many-flowered, more or less flattened. Two lower scales empty, unequal, shorter than the flowering ones, keeled, 1-nerved, or the second 3-nerved; flowering scales membranous, keeled, 3-nerved; palets shorter than the scales, prominently 2-nerved or 2-keeled, usually persisting on the rachilla after the fruiting scale has fallen. Stamens 2 or 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek etymology doubtful, perhaps signifying a low grass, or *Love-grass*, an occasional English name.]

A genus of about 100 species, widely distributed throughout all warm and temperate countries. Besides the following, some 15 others occur in the southern and western parts of North America.

Culms often decumbent at the base and generally much branched, 1½° tall or less.
  Spikelets 2–5-flowered, 1″–1½″ long.
    Culms branched only at the very base; pedicels and branches of the panicle long and capillary. 1. *E. capillaris.*
    Culms branched above the base; pedicels and branches of the panicle short. 2. *E. Frankii.*
  Spikelets 5–many-flowered, 1½″–8″ long.
    Spikelets ¾″ wide or less.
      Flowering scales thin, usually bright purplish, the lateral nerves faint or wanting; spikelets about ½″ wide. 3. *E. pilosa.*
      Flowering scales firm, usually dull purple or green, the lateral nerves very prominent; spikelets about ¾″ wide. 4. *E. Purshii.*
    Spikelets 1″ wide or more.
      Lower flowering scales about ¾″ long; spikelets 1″ wide. 5. *E. Eragrostis.*
      Lower flowering scales 1″–1¼″ long; spikelets 1¼″–1½″ wide. 6. *E. major.*
Culms erect or ascending, simple, rigid, 1½°–4° tall.
  Spikelets not clustered.
    Branches of the open panicle widely spreading, at least when old.
      Spikelets closely sessile. 7. *E. sessilispica.*
      Spikelets more or less pedicelled.
        Pedicels long, commonly at least the length of the spikelets. 9. *E. pectinacea.*
        Pedicels commonly much shorter than the spikelets.
          Leaves elongated; branches of the panicle long and slender; spikelets scattered, 6–25-flowered. 10. *E. refracta.*
          Leaves not elongated; branches of the panicle short and stout, rigid, spikelets crowded, 5–12-flowered. 8. *E. curtipedicellata.*
    Branches of the elongated panicle erect or ascending, capillary, somewhat flexuous. 11. *E. trichodes.*
  Spikelets clustered on the very short erect or ascending branches. 12. *E. secundiflora.*
Culms extensively creeping; flowers dioecious. 13. *E. hypnoides.*

1. Eragrostis capillàris (L.) Nees. Capillary Eragrostis. (Fig. 428.)

Poa capillaris L. Sp. Pl. 68. 1753.
Poa tenuis Ell. Bot. S. C. & Ga. 1: 156. 1817.
Eragrostis capillaris Nees, Agrost. Bras. 505. 1829.

Culms 8′–18′ tall, erect, slender, sparingly branched at the base, smooth and glabrous. Sheaths short, overlapping and crowded at the base of the culm, glabrous or sparingly hairy, the upper enclosing the base of the panicle; ligule a ring of very short hairs; leaves 3′–10′ long, 1″–2″ wide, long-acuminate, smooth beneath, scabrous above and sparingly hirsute near the base; panicle diffuse, 4′–15′ in length, the branches capillary, spreading or ascending, 1½′–5′ long; spikelets ovate, 2–4-flowered, little flattened, 1″–1½″ long; empty scales about equal, acute; flowering scales acute, the lower ¾″ long, the lateral nerves obscure.

In dry places, Rhode Island to New York and Missouri, south to Georgia and Texas. Aug.–Sept.

2. Eragrostis Fránkii Steud. Frank's Eragrostis. (Fig. 429.)

Eragrostis Frankii Steud. Syn. Pl. Gram. 273. 1855.
Eragrostis erythrogona Nees; Steud. Syn. Pl. Gram. 273. 1855.

Glabrous, culms 6′–15′ tall, tufted, erect, or often decumbent at the base, branched, smooth. Sheaths loose, shorter than the internodes; ligule a ring of hairs; leaves 2′–5′ long, 1″–2″ wide, smooth beneath, scabrous above; panicle 2′–6′ in length, open, the branches ascending, the lower 1′–1½′ long; spikelets ovate, 3–5-flowered, 1″–1½″ long; empty scales acute, the first shorter than the second; flowering scales acute, the lower ¾″ long, the lateral nerves obscure.

In moist places, southeastern New York and northern New Jersey to Minnesota, south to Mississippi, Louisiana and Kansas. Sept.–Oct.

3. Eragrostis pilòsa (L.) Beauv. Tufted Eragrostis. (Fig. 430.)

Poa pilosa L. Sp. Pl. 68. 1753.
Poa Caroliniana Spreng. Mant. Fl. Hal. 33. 1807?
Eragrostis pilosa Beauv. Agrost. 162. 1812.

Culms 6′–18′ tall, tufted, erect, slender, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, sometimes pilose at the throat; ligule a ring of short hairs; leaves 1′–5′ long, 1″ wide or less, smooth beneath, scabrous above; panicle 2′–6′ in length, the branches at first erect, finally widely spreading, 1′–1½′ long, often hairy in the axils; spikelets 5–12-flowered, 1½″–3″ long, about ½″ wide; lower scales acute, the first one-half as long as the second; flowering scales acute, the lower ¾″ long, thin, usually purplish, the lateral nerves faint or wanting.

Waste places or cultivated ground, southern New England to Illinois and Kansas, south to Florida and Texas. Naturalized from Europe. Aug.–Sept.

4. Eragrostis Púrshii Schrad. Pursh's Eragrostis. (Fig. 431.)

Poa Caroliniana Spreng. Mant. Fl. Hal. 33. 1807?
Eragrostis Purshii Schrad. Linnaea, 12: 451. 1838.
Eragrostis Caroliniana Scribn. Mem. Torr. Club, 5: 49. 1895.

Culms 6′–18′ tall, tufted, usually decumbent at the base and much branched, smooth and glabrous. Sheaths loose, shorter than the internodes, smooth and glabrous; ligule a ring of short hairs; leaves 1½′–3½′ long, 1″ wide or less, smooth beneath, rough above; panicle open, 3′–8′ long, the branches spreading, 1′–2½′ long, naked in the axils; spikelets 5–15-flowered, dull purple or green, 1½″–4″ long, about ¾″ wide; empty scales acute, the lower about two-thirds as long as the upper, scabrous on the keel; flowering scales acute, firm, the lower ones ¾″ long, the lateral nerves prominent.

In dry places, apparently throughout the United States, extending into Ontario. Aug.–Sept.

5. Eragrostis Eragróstis (L.) Karst. Low Eragrostis. (Fig. 432.)

Poa Eragrostis L. Sp. Pl. 68. 1753.
Eragrostis poaeoides Beauv. Agrost. 162. 1812.
Eragrostis minor Host, Fl. Austr. 1: 135. 1827.
Eragrostis Eragrostis Karst. Deutsch. Fl. 389. 1880–83.

Culms seldom over 15′ tall, tufted, usually decumbent and much branched, smooth and glabrous. Sheaths loose, shorter than the internodes, smooth, sometimes a little pubescent, sparingly pilose at the throat; ligule a ring of short hairs; leaves 1′–2½′ long, ½″–2″ wide, smooth beneath, rough above and somewhat pilose near the base; panicle 2′–4½′ in length, the branches spreading or ascending, ¾′–1½′ long; spikelets 8–18-flowered, 3″–5″ long, about 1″ wide; empty scales acute, the first two-thirds as long as the second; flowering scales obtuse, ¾″ long, the lateral nerves prominent.

In waste places or cultivated ground, Ontario to New England, New York and Pennsylvania. Locally naturalized from Europe. July–Sept.

6. Eragrostis màjor Host. Strong-scented Eragrostis. (Fig. 433.)

Eragrostis major Host, Gram. Austr. 4: 14. *pl. 24.* 1809.
Eragrostis poaeoides var. *megastachya* A. Gray, Man. Ed. 5, 631. 1867.

Culms 6′-2° tall, erect, or decumbent at the base, usually branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, sparingly pilose at the throat; ligule a ring of short hairs; leaves 2′–7′ long, 1″–3″ wide, flat, smooth beneath, scabrous above; panicle 2′–6′ in length, the branches spreading or ascending, 1′–2′ long; spikelets 8–35-flowered, 2½″–8″ long, about 1½″ wide, very flat; empty scales acute, the first slightly shorter than the second; flowering scales obtuse, 1″–1¼″ long, the lateral nerves prominent.

In waste and cultivated places nearly throughout the United States, and in Ontario. Naturalized from Europe. Unpleasantly scented, handsome. Aug.–Sept.

7. Eragrostis sessilispìca Buckley. Prairie Eragrostis. (Fig. 434.)

Eragrostis sessilispica Buckley, Proc. Acad. Phila. 1862: 97. 1862.

Diplachne rigida Vasey, Grasses S. W., Part 2. *pl. 41.* 1891.

Culms 8′–3½° tall, erect, simple, smooth and glabrous. Sheaths short, crowded at the base of the culm, smooth, pilose at the summit; ligule a ring of short hairs; leaves 2′–6′ long, ¾″–1½″ wide, rough above, glabrous or sparingly pilose beneath; panicle 8′–16′ in length, the branches stout, rigid, widely diverging; spikelets scattered, closely sessile, appressed, 5–12-flowered, 4″–7″ long, empty scales about equal in length, acute; flowering scales very acute, about 2″ long, the lateral nerves very prominent.

Prairies, Kansas to Texas. Aug.–Sept.

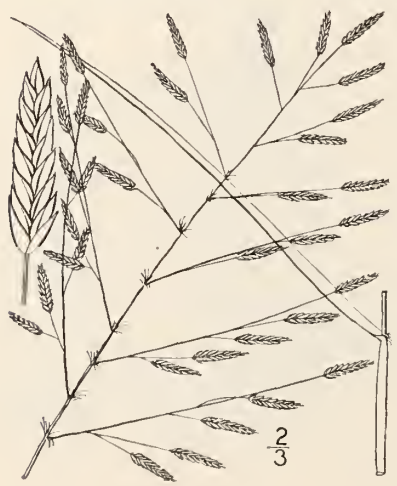
8. Eragrostis curtipedicellàta Buckley. Short-stalked Eragrostis. (Fig. 435.)

Eragrostis curtipedicellata Buckley, Proc. Acad. Phila. 1862: 97. 1862.

Culms 6′–3° tall, erect, rigid, simple, smooth and glabrous. Sheaths overlapping, smooth, pilose at the summit; ligule a ring of short hairs; leaves 2′–8′ long, 1″–2″ wide, smooth beneath, scabrous above; panicle 4′–12′ in length, the branches widely spreading, 1½′–4½′ long; spikelets 5–12-flowered, 1½″–3″ long, on pedicels of less than their own length; scales acute, the empty ones somewhat unequal, the flowering ones about ⅞″ long, scabrous on the midnerve, their lateral nerves prominent.

Prairies, Kansas to Texas. Aug.–Sept.

9. Eragrostis pectinàcea (Michx.) Steud. Purple Eragrostis. (Fig. 436.)



Poa pectinacea Michx. Fl. Bor. Am. 1: 69. 1803.
Eragrostis pectinacea Steud. Syn. Pl. Gram. 272. 1855.
Eragrostis pectinacea var. *spectabilis* A. Gray, Man. Ed. 5, 632. 1867.

Culms 1°–2½° tall, erect or ascending, rigid, simple, smooth and glabrous. Sheaths overlapping, smooth, glabrous or villous, the upper one often enclosing the base of the panicle; ligule a ring of hairs; leaves 5′–12′ long, 2″–4″ wide, smooth beneath, scabrous above and sparingly villous at the base; panicle 6′–24′ in length, purple or purplish, the branches 3′–10′ long, strongly bearded in the axils, widely spreading or the lower often reflexed; spikelets 5–15-flowered, 1½″–4″ long, on pedicels of at least their own length; scales acute, the empty ones about equal, the flowering ones about ⅞″ long, their lateral nerves very prominent.

In dry soil, Massachusetts to Illinois and South Dakota, south to Florida and Texas. Aug.–Sept.

10. Eragrostis refrácta (Muhl.) Scribn. Meadow Eragrostis. (Fig. 437.)

Poa refracta Muhl. Gram. 146. 1817.
Eragrostis campestris Trin. Bull. Acad. Sci. St. Petersb. 1: 70. 1836.
Eragrostis refracta Scribn. Mem. Torr. Club, 5: 49. 1894.

Culms 1°–3° tall, erect, slender, simple, smooth and glabrous. Sheaths overlapping, smooth and glabrous; ligule a ring of short hairs; leaves 5′–12′ long, 1″–2″ wide, smooth beneath, rough above, and villous toward the base; panicle 8′–20′ long; branches slender, 4′–10′ long, at length widely spreading, the axils often bearded; spikelets 6–25-flowered, 2½″–6″ long, on pedicels shorter than themselves; empty scales acute, the first somewhat shorter than the second; flowering scales very acute, ¾″–1″ long, the lateral nerves prominent.

In moist soil, Delaware and Maryland to Florida, west to Texas. Aug.–Sept.

11. Eragrostis trichòdes (Nutt.) Nash. Hair-like Eragrostis. (Fig. 438.)

Poa trichodes Nutt. Trans. Am. Phil. Soc. (II.) 5: 146. 1833–37.
Eragrostis tenuis A. Gray, Man. Ed. 2, 564. 1856. Not Steud. 1855, nor *Poa tenuis* Ell. 1817.
Eragrostis trichodes Nash, Bull. Torr. Club, 22: 465. 1895.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths overlapping, smooth, pilose at the throat; ligule a ring of very short hairs; leaves 6′–28′ long, 1″–2″ wide, smooth beneath, slightly scabrous above, attenuate into a long slender tip; panicle 9′–26′ in length, narrow and elongated, the branches erect or ascending, capillary, subdividing, somewhat flexuous, 3′–7′ long; lower axils sometimes bearded; spikelets usually pale, 3–10-flowered, 2½″–4½″ long; lower scales very acute, about equal; flowering scales acute, the lower ones 1¼″–1½″ long, their lateral nerves manifest.

In dry sandy soil, Ohio and Illinois to Nebraska, south to Tennessee and Texas. Aug.–Sept.

12. Eragrostis secundiflòra Presl. Clustered Eragrostis. (Fig. 439.)

Poa interrupta Nutt. Trans. Am. Phil. Soc. (II.) 5: 146. 1833–37. Not Lam. 1791.
Eragrostis secundiflora Presl, Rel. Haenk. 1: 276. 1830.
Eragrostis oxylepis Torr. Marcy's Report, 269. 1854.

Smooth and glabrous, culms 6′–3° tall, erect, simple. Sheaths shorter than the internodes; ligule a ring of hairs; leaves 2′–12′ long, 1″–2″ wide; panicle 1½′–6′ in length, the branches ½′–1½′ long, erect or ascending; spikelets crowded or clustered, sessile or nearly so, strongly flattened, 8–40-flowered, 3″–10″ long, 1″–2½″ wide; lower scales acute, about equal; flowering scales 1½″–1¾″ long, acute, usually purple-bordered, the lateral nerves prominent.

In dry soil, Kansas and Missouri, south to Texas and Louisiana. Aug.–Sept.

13. Eragrostis hypnoides (Lam.) B.S.P. Creeping Eragrostis. (Fig. 440.)

Poa hypnoides Lam. Tabl. Encycl. 1: 185. 1791.
Eragrostis reptans Nees, Agrost. Bras. 514. 1829.
Eragrostis hypnoides B.S.P. Prel. Cat. N. Y. 69. 1888.

Culms 1′–18′ long, extensively creeping, branched, smooth and glabrous, the branches erect or ascending, 1′–6′ high. Sheaths shorter than the internodes, villous at the summit; ligule a ring of short hairs; leaves 2′ long or less, ½″–1″ wide, flat, smooth beneath, rough above; spikelets dioecious, 10–35-flowered, 2″–8″ long; lower scales unequal, the first one-half to two-thirds as long as the second; flowering scales about 1¼″ long, the lateral nerves prominent; scales of the pistillate flowers more acute than those of the staminate.

On sandy or gravelly shores, Vermont and Ontario to Oregon, south to Florida and Mexico. Also in the West Indies. Aug.–Sept.

66. EATÒNIA Raf. Journ. Phys. 89: 104. 1819.

Tufted perennial grasses, with flat or involute leaves and usually contracted panicles. Spikelets 2–3-flowered; the rachilla extended beyond the flowers. Two lower scales empty, shorter than the spikelet, the first linear, acute, 1–nerved, the second much broader, 3–nerved, obtuse or rounded at the apex, or sometimes acute, the margins scarious; flowering scales narrower, generally obtuse. Palet narrow, 2–nerved. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [In honor of Amos Eaton, 1776–1842, American botanist.]

A genus of 4 or 5 species, confined to North America.

Empty scales unequal, the first shorter and about one-sixth as wide as the second.
Second scale obovate, often almost truncate. 1. *E. obtusata.*
Second scale oblanceolate, obtuse or abruptly acute. 2. *E. Pennsylvanica.*
Empty scales equal, the first not less than one-third as wide as the second. 3. *E. nitida.*

1. Eatonia obtusàta (Michx.) A. Gray. Blunt-scaled Eatonia. (Fig. 441.)

Aira obtusata Michx. Fl. Bor. Am. 1: 62. 1803.
Eatonia obtusata A. Gray, Man. Ed. 2, 558. 1856.

Culms 1°–2½° tall, erect, simple, often stout, smooth and glabrous. Sheaths shorter than the internodes, usually more or less rough, sometimes pubescent; ligule ½″–1″ long; leaves 1′–9′ long, 1″–4″ wide, scabrous; panicle 2′–6′ in length, dense and generally spikelike, strict, the branches 1½′ long or less, erect; spikelets crowded, 1¼″–1½″ long; empty scales unequal, often purplish, the first narrow, shorter than and about one-sixth as wide as the obtuse or almost truncate second one; flowering scales narrow, obtuse, ¾″–1″ long.

In dry soil, Massachusetts and Ontario to Assiniboia, Florida and Arizona. June–Aug.

2. Eatonia Pennsylvánica (DC.) A. Gray. Pennsylvania Eatonia. (Fig. 442.)

Koeleria Pennsylvanica DC. Cat. Hort. Monsp. 117. 1813.

Eatonia Pennsylvanica A. Gray, Man. Ed. 2, 558. 1856.

Usually glabrous, culms 1°–3° tall, erect, simple, slender, smooth. Sheaths shorter than the internodes; ligule ¾″ long; leaves 2½′–7′ long, 1″–3″ wide, rough; panicle 3′–7′ in length, contracted, often nodding, lax, its branches 1′–2½′ long; spikelets 1½″–1¾″ long, usually numerous, somewhat crowded and appressed to the branches; empty scales unequal, the first narrow, shorter than and about one-sixth as broad as the obtuse or abruptly acute second one, which is smooth, or somewhat rough on the keel; flowering scales narrow, acute, 1¼″ long.

In hilly woods or moist soil, New Brunswick to British Columbia, south to Georgia, Louisiana and Texas. June–July.

Eatonia Pennsylvánica màjor Torr.; A. Gray, Man. Ed. 2, 558. 1856.

Culms taller; panicle longer and more compound; leaves longer and broader. Range apparently nearly that of the typical form.

3. Eatonia nítida (Spreng.) Nash. Slender Eatonia. (Fig. 443.)

Aira nitida Spreng. Fl. Hal. Mant. 1: 32. 1807.

Eatonia Dudleyi Vasey, Coult. Bot. Gaz. 11: 116. 1886.

Eatonia nitida Nash, Bull. Torr. Club, 22: 511. 1895.

Glabrous, culms 1°–2° tall, erect, very slender, smooth. Sheaths shorter than the internodes, generally pubescent; ligule ¼″ long; leaves ½′–3′ long, 1″ wide or less, often pubescent, the uppermost very short; panicle 2′–6′ in length, lax, the branches spreading at flowering time, afterwards erect, 1′–2½′ long; spikelets not crowded, 1½″ long; empty scales smooth, the first about one-third as wide as and equalling the second, which is obtuse or almost truncate, often apiculate; flowering scales narrow, 1″–1¼″ long, obtuse or acutish, smooth.

In dry woods, southern New York and New Jersey to Georgia and Alabama. May–June.

67. KOELÈRIA Pers. Syn. 1: 97. 1805.

Tufted annual or perennial grasses, with flat or setaceous leaves and mostly spike-like panicles. Spikelets 2–5-flowered. Two lower scales empty, narrow, acute, unequal, keeled, scarious on the margins; the flowering scales 3–5-nerved. Palet hyaline, acute, 2-keeled. Stamens 3. Styles very short. Stigmas plumose. Grain free, enclosed in the scale and palet. [In honor of Georg Ludwig Koeler, German botanist.]

About 15 species of wide geographic distribution. The following, which may contain two forms, occurs in North America.

1. **Koeleria cristàta** (L.) Pers. Koeleria. (Fig. 444.)

Aira cristata L. Sp. Pl. 63. 1753.
Koeleria cristata Pers. Syn. 1: 97. 1805.
Koeleria nitida Nutt. Gen. 1: 74. 1818.
Koeleria cristata var. *gracilis* A. Gray, Man. 591. 1848.

Culms 1°–2½° tall, erect, simple, rigid, smooth, often pubescent just below the panicle. Sheaths often shorter than the internodes, smooth or scabrous, sometimes hirsute; ligule ½″ long; leaves 1′–12′ long, ½″–1½″ wide, erect, flat or involute, smooth or rough, often more or less hirsute; panicle 1′–7′ in length, pale green, usually contracted or spike-like, the branches erect or rarely ascending, 1′ long or less; spikelets 2–5-flowered, 2″–3″ long, the scales rough, acute, the empty ones unequal; flowering scales 1½″–2″ long, shining.

In dry sandy soil, especially on prairies, Ontario to British Columbia, south to Pennsylvania, Nebraska, Texas and California. Also in Europe and Asia. Very variable. July–Sept.

68. CATABRÒSA Beauv. Agrost. 97. *pl. 19. f. 8.* 1812.

A perennial grass, with soft flat leaves and an open panicle. Spikelets usually 2-flowered. Two lower scales empty, thin-membranous, much shorter than the flowering ones, unequal, rounded or obtuse at the apex; flowering scales membranous, erose-truncate. Palet barely shorter than the scale. Stamens 3. Styles distinct. Stigmas plumose. [Greek, in allusion to the erose top of the flowering scales.]

A monotypic genus of arctic and mountainous regions of the northern hemisphere.

1. **Catabrosa aquática** (L.) Beauv. Water Whorl-grass. (Fig. 445.)

Aira aquatica L. Sp. Pl. 64. 1753.
Catabrosa aquatica Beauv. Agrost. 157. 1812.

Smooth and glabrous, culms 4′–2° tall, erect, from a creeping base, bright green, flaccid. Sheaths usually overlapping, loose; ligule 1½″–2½″ long; leaves 1½′–5′ long, 1″–3″ wide, flat, obtuse; panicle 1′–8′ in length, open, the branches whorled, spreading or ascending, very slender, ½′–2′ long; spikelets 1¼″–1¾″ long, the empty scales rounded or obtuse, the first about half as long as the second, which is crenulate on the margins; flowering scales 1″–1¼″ long, 3-nerved, erose-truncate at the apex.

In water or wet soil, Labrador and Quebec to Alaska, south to Nebraska, Colorado and Utah. Also in Europe and Asia. Summer.

69. MÉLICA L. Sp. Pl. 66. 1753.

Perennial grasses, with usually soft flat leaves and contracted or open panicles. Spikelets 1–several-flowered, often secund, the rachilla extended beyond the flowers and usually bearing 2–3 empty club-shaped or hooded scales, convolute around each other. Two lower scales empty, membranous, 3–5-nerved; flowering scales larger, rounded on the back, 7–13-nerved, sometimes bearing an awn, the margins more or less scarious; palets broad, shorter than the scales, two-keeled. Stamens three. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name used by Theophrastus for Sorghum; said to be in allusion to the sweet culms of some species.]

About 30 species, inhabiting temperate regions. Besides the following, some 15 others occur in the Rocky Mountains and on the Pacific Coast.

Second scale much shorter than the 3–5-flowered spikelets.
- Spikelets few; branches of the panicle spreading or ascending. — 1. *M. diffusa.*
- Spikelets usually numerous; branches of the panicle erect. — 2. *M. parviflora.*

Second scale nearly equalling the 2-flowered spikelet. — 3. *M. mutica.*

1. Melica diffùsa Pursh. Tall Melic-grass. (Fig. 446.)

Melica altissima Walt. Fl. Car. 78. 1788. Not L. 1753.
Melica diffusa Pursh, Fl. Am. Sept. 77. 1814.
Melica mutica var. *diffusa* A. Gray, Man. Ed. 5, 626. 1867.

Culms 1½°–4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, the lower often overlapping; ligule 1″–2″ long; leaves 4′–7′ long, 2″–4″ wide, rough; panicle 6½′–8½′ in length, open, the branches spreading or ascending, the lower 1½′–3′ long; spikelets usually numerous, about 3-flowered, 4½″–5½″ long, nodding, on slender, more or less flexuous pubescent pedicels; empty basal scales very broad, obtuse or acutish, the first shorter than the second, which is generally much exceeded by the spikelet; flowering scales 3½″–4½″ long, acute or obtuse, scabrous.

Pennsylvania to Missouri, south to Virginia, Kentucky and Texas. May–June.

2. Melica parviflòra (Porter) Scribn. Small Melic-grass. (Fig. 447.)

Melica mutica var. *parviflora* Porter; Porter & Coulter, Fl. Colo. 149. 1874.
Melica Porteri Scribn. Proc. Acad. Phila. 1885: 44. *pl. 1. f. 17, 18.* 1885.
Melica parviflora Scribn. Mem. Torr. Club, 5: 50. 1894.

Culms 1½°–2½° tall, erect, simple, smooth and glabrous. Sheaths short, overlapping, more or less rough; ligule 1″ long; leaves 5′–9′ long, 1″–2″ wide, rough; panicle 5′–7′ in length, contracted, the branches erect, the lower 1′–2′ long; spikelets few, 4-5-flowered, 5″–6½″ long, nodding, on somewhat flexuous strongly pubescent pedicels; lower scales obtuse or acutish, the first shorter than the second, which is much exceeded by the spikelet; flowering scales 3½″–4″ long, acutish, scabrous.

Prairies, Kansas and Colorado to Arizona and Texas.

3. Melica mùtica Walt. Narrow Melic-grass. (Fig. 448.)

Melica mutica Walt. Fl. Car. 78. 1788.
Melica mutica var. *glabra* A. Gray, Man. Ed. 5, 626. 1867.

Culms 1°–3° tall, erect, usually slender, simple, smooth and glabrous. Sheaths often overlapping, rough; ligule 1″–2″ long; leaves rough, 4′–9′ long, 1″–5″ wide, panicle 3½′–10½′ in length, narrow, the branches spreading or ascending, 1′–2′ long; spikelets about 2-flowered, 3½″–4½″ long, nodding, on more or less flexuous pubescent pedicels; empty scales very broad, acutish to obtuse, the first shorter than the second, which is nearly as long as the spikelet or sometimes equals it; flowering scales 3″–4″ long, generally very obtuse, scabrous.

In rich soil, Pennsylvania to Wisconsin, south to Florida and Texas. June–July.

70. KORYCÀRPUS Zea, Act. Matrit. 1806.

[DIARINA Raf. Journ. Bot. 2: 169. 1809.]
[DIARRHENA Beauv. Agrost. 142. 1812.]

Erect grasses, with long flat leaves and narrow paniculate or racemose inflorescence. Spikelets 3–5-flowered, the rachilla readily disarticulating between the flowers. Upper scales empty, convolute. Two lower scales empty, the first narrow, 3-nerved, acute, the second broader, 5-nerved; flowering scales broader than the lower ones, acuminate or mucronate, rounded on the back, finally coriaceous and shining, 3-nerved. Palet 2-keeled. Stamens 2, rarely 1. Styles short, distinct. Stigmas plumose. Grain beaked, free. [Greek, in allusion to the beaked grain.]

Two known species, the following North American, the other Japanese.

1. Korycarpus diándrus (Michx.) Kuntze. American Korycarpus. (Fig. 449.)

Festuca diandra Michx. Fl. Bor. Am. 1: 67. *pl. 10.* 1803.
Korycarpus arundinaceus Zea, Act. Matrit. 1806.
Diarrhena Americana Beauv. Agrost. 142. *pl. 25. f. 11.* 1812.
Korycarpus diandrus Kuntze, Rev. Gen. Pl. 772. 1891.

Culms 1½°–4° tall, erect, simple, very rough below the panicle. Sheaths overlapping, confined to the lower part of the culm, smooth or a little rough at the summit, sometimes pubescent; ligule very short; leaves 8′–24′ long, 5″–9″ wide, long-acuminate at the apex, usually scabrous; panicle often reduced to a raceme, 2′–7½′ in length, the branches erect, 1′–2′ long; spikelets 3–5-flowered, 6″–8″ long, the lower scales unequal, the first shorter than the second, which is much exceeded by the spikelet; flowering scales somewhat abruptly acuminate; palets shorter than the scales and exceeded by the beaked grain.

In rich woods, Ohio to Kansas, south to Georgia, Tennessee and the Indian Territory. Aug.–Sept.

71. PLEUROPÒGON R. Br. App. Parry's Voy. 289. 1824.

Erect grasses with flat leaves and racemose inflorescence. Spikelets 5–14-flowered; flowers perfect, or the upper staminate. Two lower scales empty, unequal, thin-membranous, 1-nerved, or the second imperfectly 3-nerved; flowering scales longer, membranous, 7-nerved, the middle nerve excurrent as a short point or awn. Palet scarcely shorter than the scale, 2-keeled, the keels winged or appendaged. Stamens 3. Styles short. Stigmas plumose. Grain free, enclosed in the scale and palet. [Greek, side-beard, from the appendages to the palets.]

Three known species, the following arctic, the others Californian.

1. Pleuropogon Sabínii R. Br. Sabine's Pleuropogon. (Fig. 450.)

Pleuropogon Sabinii R. Br. App. Parry's Voy. 289. 1824.

Smooth, culms 6′ or less tall, erect, simple, glabrous. Sheaths one or two; ligule 1″ long; leaves ¼′–1′ long, erect, glabrous; raceme 1′–2′ in length; spikelets 3–6, 5–8-flowered, about 5″ long, on spreading or reflexed pedicels 1″ or less in length; lower scales smooth, the first acute, shorter than the obtuse second; flowering scales oblong, 2″–2½″ long, erose-truncate at the scarious summit, scabrous, the midnerve sometimes excurrent as a short point; palet slightly shorter than the scale, truncate and somewhat 2-toothed at the apex, bearing an awn-like appendage on each keel near the middle.

Arctic regions of both the Old World and the New. Summer.

72. UNÌOLA L. Sp. Pl. 71. 1753.

Erect and often tall grasses with flat or convolute leaves and paniculate inflorescence. Spikelets 3–many-flowered, flat, 2-edged, the flowers perfect, or the upper staminate. Scales flattened, keeled, sometimes winged, rigid, usually acute; the lower 3–6 empty, unequal; the flowering scales many-nerved, the uppermost scales often smaller and empty; palets rigid, 2-keeled. Stamens 1–3. Styles distinct. Stigmas plumose. Grain compressed, free, loosely enclosed in the scale and palet. [Name diminutive of *unus*, one, of no obvious application.]

About 8 species, natives of America. Besides the following, 2 others occur in the southeastern United States.

Spikelets about ¼′ in length; panicle spike-like. 1. *U. laxa.*
Spikelets exceeding ½′ in length; panicle open.
Panicle lax, the branches pendulous; spikelets on long capillary pedicels. 2. *U. latifolia.*
Panicle strict, the branches erect, rigid; spikelets on short stout pedicels. 3. *U. paniculata.*

1. Uniola láxa (L.) B.S.P. Slender Spike-grass. (Fig. 451.)

Holcus laxus L. Sp. Pl. 1048. 1753.
Uniola gracilis Michx. Fl. Bor. Am. 1: 71. 1803.
Uniola laxa B.S.P. Prel. Cat. N. Y. 69. 1888.

Smooth and glabrous, culms 1½°–4° tall, erect, simple, slender. Sheaths shorter than the internodes; ligule very short; leaves 5′–15′ long, 1″–3″ wide, usually erect, flat, attenuate into a long tip, smooth or slightly rough; panicle spike-like, 4′–12′ in length, erect, strict, or nodding at the summit, the branches erect, 1′–2′ long; spikelets short-stalked or nearly sessile, 3–6-flowered, about 3″ long; lower scales much shorter than the flowering ones, which are 1½″–2″ long, acuminate, spreading in fruit; palet arched, about two-thirds as long as the scale; stamen 1.

Sandy soil, Long Island to Pennsylvania and Kentucky, south to Florida and Texas, mostly near the coast. Ascends to 900 ft. in North Carolina. Aug.–Sept.

2. Uniola latifòlia Michx. Broad-leaved Spike-grass. (Fig. 452.)

Uniola latifolia Michx. Fl. Bor. Am. 1: 70. 1803.

Culms 2°–5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ½″ long, lacerate-toothed; leaves 4′–9′ long, ¼′–1′ wide, flat, narrowed into a somewhat rounded, often ciliate base, acuminate at the apex, smooth, excepting on the margins; panicle lax, 5½′–10′ in length, its branches filiform and pendulous, the lower 2′–5′ long; spikelets many-flowered, oblong to ovate, ¾′–1¼′ long, on long capillary pendulous pedicels; lower scales much smaller than the flowering ones, which are 4½″–6″ long, ciliate-hispid on the winged keel; stamen 1.

In moist places, Pennsylvania to Illinois and Kansas, south to Florida and Texas. Ascends to 2000 ft. in North Carolina. Aug.–Sept.

3. Uniola paniculàta L. Sea Oats. (Fig. 453.)

Uniola paniculata L. Sp. Pl. 71. 1753.

Glabrous thoroughout, culms 3°–8° tall, erect, simple, smooth. Sheaths often longer than the internodes; ligule a ring of hairs about ½″ long; leaves 1° long or more, about ¼′ wide, involute when dry, attenuate into a long slender tip; panicle 9′–1° in length or more, the branches erect or ascending, strict, rigid, the lower 2½′–5′ long; spikelets many-flowered, short-pedicelled, ovate to oval when mature, ½′–1′ long; lower scales much shorter than the flowering ones, which are 4″–5″ long and scabrous on the keels; stamens 3.

In sands of the seacoast, Virginia to Florida and west to Texas. Also in the West Indies and South America. Spikelets persistent into the winter. Oct.–Nov.

73. DISTÍCHLIS Raf. Journ. Phys. 89: 104. 1819.

Dioecious grasses, with rigid culms creeping or decumbent at the base, flat or convolute leaves and spike-like paniculate inflorescence. Spikelets flattened, more numerous on the staminate plants than on the pistillate, 6–16-flowered; rachilla continuous in the staminate spikelets, articulated in the pistillate. Two lower scales empty, narrow, keeled, acute, shorter than the flowering ones; flowering scales broader, many-nerved, acute, rigid; palets 2-keeled. Stamens 3. Styles thickened at the base, rather long, distinct. Stigmas long-plumose. Grain free, enclosed in the scale and palet. [Greek, signifying two-ranked, probably in reference to the spikelets.]

Four known species, natives of America, inhabiting the sea coast or alkaline soil; one of them is also found in Australia.

1. Distichlis spicàta (L.) Greene. Marsh Spike-grass. (Fig. 454.)

Uniola spicata L. Sp. Pl. 71. 1753.
Distichlis maritima Raf. Journ. Phys. 89: 104. 1819.
Uniola stricta Torr. Ann. Lyc. N. Y. 1: 155. 1824.
Distichlis spicata Greene, Bull. Cal. Acad. 2: 415. 1887.
Distichlis spicata var. *stricta* Scribn. Mem. Torr. Club, 5: 51. 1894.

Glabrous throughout, culms 3′–2° tall, erect from a horizontal rootstock, or often decumbent at the base. Sheaths overlapping and often crowded; ligule a ring of very short hairs; leaves ½′–6′ long, 1″–2″ wide, flat or involute; panicle dense and spike-like, ¾′–2½′ in length, the branches 1′ long or less, erect; spikelets 6–16-flowered, 4″–9″ long, pale green; empty scales acute, the first 1–3-nerved, two-thirds as long as the 3–5-nerved second one; flowering scales 1½″–2½″ long, acute or acuminate.

On salt meadows along the Atlantic coast from Maine to Florida, in saline soil throughout the interior, and on the Pacific coast north to British Columbia. The main figure is that of the staminate plant. June–Aug.

74. BRÌZA L. Sp. Pl. 70. 1753.

Annual or perennial grasses, with flat or convolute leaves and open or rarely contracted panicles. Spikelets large, flattened, tumid, many-flowered, nodding, the flowers perfect. Scales thin-membranous, strongly concave, the 2 lower empty, 3–5-nerved, somewhat unequal; floweriug scales imbricated, broader than the empty ones, 5–many-nerved; uppermost scales often empty; palets much shorter than the scales, hyaline, 2-keeled or 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain usually free, euclosed in the scale and palet. [Greek name for some grain, perhaps rye.]

About 12 species, natives of the Old World and temperate South America.

Perennial; ligule ½″ long or less, truncate; spikelets 5–12-flowered, 2″–2½″ long. 1. *B. media.*
Annual; ligule 1″ long or more, acute; spikelets 3–6-flowered, 1″–1½″ long. 2. *B. minor.*

1. Briza mèdia L. Quake-grass. Quaking Grass. (Fig. 455.)

Briza media L. Sp. Pl. 70. 1753.

Smooth and glabrous, culms 6′–2° tall, erect, from a perennial root, simple. Sheaths shorter than the internodes; ligule ½″ long or less, truncate; leaves 1′–3′ long, 1″–2½″ wide; panicle 1½′–5′ in length, the capillary branches spreading or ascending, 1′–2½′ long; spikelets 2″–2½″ long, orbicular to deltoid-ovate, 5–12-flowered; scales scarious-margined, the lower ones about 1″ long; flowering scales 1″–1½″ long, broader than the lower ones, widely spreading.

In fields and waste places, Ontario to Massachusetts and Rhode Island. Naturalized from Europe. Native also of Asia. June–July.

2. Briza mìnor L. Lesser Quaking Grass. (Fig. 456.)

Briza minor L. Sp. Pl. 70. 1753.

Smooth aud glabrous, culms 4′–15′ tall, erect from an anuual root, simple. Sheaths shorter than the interuodes; ligule 1″–3″ long, acute; leaves 1′–5′ long, 1″–4″ wide, sometimes scabrous; panicle 2′–5′ in length, opeu, the capillary branches spreading or ascending, 1′–2½′ long; spikelets 3–6-flowered, 1″–1½″ long, about 2″ broad, truncate at the base; scales scarious-margined, the lower ones about 1″ long; floweriug scales much broader and deeply saccate, about ¾″ long.

In ballast and waste places about Camden, N. J.; common in California, and widely distributed in tropical America. Adventive or naturalized from Europe. June–July.

75. DÁCTYLIS L. Sp. Pl. 71. 1753.

A tall perennial grass, with flat leaves and paniculate inflorescence. Spikelets 3–5-flowered, short-pedicelled, in dense capitate clusters, the flowers perfect or the upper staminate. Two lower scales empty, thin-membranous, keeled, unequal, mucronate; flowering scales larger than the empty ones, rigid, 5-nerved, keeled, the midnerve extended into a point or short awn; palets shorter than the scales, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name used by Pliny for some grass with finger-like spikes].

A monotypic genus of Europe and Asia.

1. Dactylis glomeràta L. Orchard Grass. (Fig. 457.)

Dactylis glomerata L. Sp. Pl. 71. 1753.

Culms 2°–4° tall, tufted, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or rough; ligule 1″–2″ long; leaves 3′–9′ long, 1″–3″ wide, flat, scabrous; panicle 3′–8′ in length, the branches spreading or ascending in flower, erect in fruit, the lower 1′–2½′ long, spikelet-bearing from above or below the middle; spikelets in dense capitate clusters, 3–5-flowered; lower scales 1–3-nerved, the first shorter than the second; flowering scales 2″–3″ long, rough, pointed or short-awned, ciliate on the keel.

In fields and waste places, New Brunswick to Manitoba, south to South Carolina and Kansas. Naturalized from Europe and cultivated for fodder. June–July.

76. CYNOSÙRUS L. Sp. Pl. 72. 1753.

Annual or perennial tufted grasses, with flat leaves and dense spike-like inflorescence. Spikelets of two kinds, in small clusters; lower spikelets of the clusters consisting of narrow empty scales, with a continuous rachilla, the terminal spikelets of 2–4 broader scales, with an articulated rachilla and subtending perfect flowers. Two lower scales in the fertile spikelets empty, 1-nerved, the flowering scales broader, 1–3-nerved, pointed or short-awned; upper scales narrower, usually empty. Scales of the sterile spikelets pectinate, spreading, all empty, linear-subulate, 1-nerved. Stamens 3. Styles distinct, short. Stigmas loosely plumose. Grain finally adherent to the palet. [Greek, signifying dog's tail, referring to the spike.]

About 5 species, natives of the Old World.

1. Cynosurus cristàtus L. Dog's-tail Grass. (Fig. 458.)

Cynosurus cristatus L. Sp. Pl. 72. 1753.

Culms 1°–2½° tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ½″ long, truncate; leaves 1½′–5′ long, ½″–2″ wide, smooth, glabrous; spike-like panicle 2′–4′ in length, 2½″–6″ wide, long-exserted; spikelets arranged in clusters, the terminal fertile, the lower larger and sterile; scales of the former about 1½″ long, pointed or short-awned, the scales of the sterile spikelets very narrow, pointed, strongly scabrous on the keel.

In fields and waste places, Quebec and Ontario to southern New York and New Jersey. Adventive from Europe. June–Aug.

77. POA L. Sp. Pl. 67. 1753.

Annual or perennial grasses with flat or convolute leaves and contracted or open panicles. Spikelets 2–6-flowered, compressed, the rachilla usually glabrous; flowers perfect, or rarely dioecious. Scales membranous, keeled; the 2 lower empty, 1–3-nerved; the flowering scales longer than the empty ones, generally with a tuft of cobwebby hairs at the base, 5-nerved, the marginal nerves usually pubescent, often also the dorsal one; palets a little shorter than the scales, 2-nerved or 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain free, or sometimes adherent to the palet. [Name Greek, for grass or herbage.]

A genus of about 100 species, widely distributed in all temperate and cold regions. The English name *Meadow-grass* is often applied to most of the species. Besides the following some 50 others occur in the western parts of North America.

Low annual or biennial grasses, the culms 12′ tall or less.
- Flowering scales distinctly 5-nerved, not webby at the base. 1. *P. annua.*
- Flowering scales 3-nerved, or obscurely 5-nerved, webby at the base. 2. *P. Chapmaniana.*

Perennials, mostly with tall culms (Nos. 4–7 low).
- Grasses of far northern or high mountain regions, generally low.
  - Leaves short; panicle-branches short, generally widely spreading. 6. *P. alpina.*
  - Leaves longer, gradually narrowed to the apex.
    - Spikelets less than 3″ long.
      - Branches of the panicle erect, smooth, slender, lax.
        - Flowering scales glabrous or slightly pubescent. 5. *P. laxa.*
        - Flowering scales strongly pubescent all over. 4. *P. abbreviata.*
      - Branches widely spreading, flexuous, smooth. 7. *P. cenisia.*
      - Branches of the panicle rough, erect or ascending.
        - Lower flowering scale 1″–1¼″ long. 12. *P. nemoralis.*
        - Lower flowering scale 2″ long. 11. *P. glauca.*
    - Spikelets exceeding 3″ in length. 22. *P. glumaris.*
- Grasses not exclusively of far northern or high mountain regions; culms generally tall.
  - Culms strongly flattened. 3. *P. compressa.*
  - Culms terete or but slightly flattened.
    - Panicle lax; branches long, slender, naked half their length, usually widely spreading.
      - Basal leaves much shorter than the culm.
        - Pedicels commonly shorter than the spikelets.
          - Flowering scales obscurely nerved; spikelets 1½″–2″ long. 13. *P. flava.*
          - Flowering scales prominently nerved.
            - Lateral nerves silky-pubescent.
              - Spikelets 2″–2½″ long; flowering scales not pubescent between the nerves; ligule truncate. 8. *P. pratensis.*
              - Spikelets 3″–4″ long; flowering scales minutely pubescent below between the nerves; ligule acute. 9. *P. pseudopratensis.*
            - Lateral nerves naked; spikelets 1½″ long. 10. *P. trivialis.*
        - Pedicels commonly equalling or much exceeding the spikelets.
          - Flowering scales rounded or retuse at the apex:
            - Not webbed at the base, pubescent below. 15. *P. autumnalis.*
            - Webbed at the base, glabrous. 14. *P. debilis.*
          - Flowering scales obtuse or acute, webbed at the base.
            - Flowering scales about 1¼″ long, often pubescent between the nerves toward the base. 16. *P. sylvestris.*
            - Flowering scales 1½″–2″ long, glabrous between the nerves:
              - Obscurely nerved, very acute, midnerve pubescent toward the base. 17. *P. alsodes.*
              - Plainly nerved; nerves pilose. 18. *P. Wolfii.*
      - Basal leaves about equalling the culm; culm leaves short. 19. *P. brevifolia.*
    - Panicle contracted; the branches short, erect or ascending, mostly spikelet-bearing nearly to the base; western species.
      - Flowering scales erose-truncate, very pubescent below between the silky-pubescent nerves. 20. *P. arida.*
      - Flowering scales acutish, nearly or quite glabrous. 21. *P. Buckleyana.*

1. Poa annua L. Annual Meadow Grass. Low Spear-grass. (Fig. 459.)

Poa annua L. Sp. Pl. 68. 1753.

Culms 2′–1° tall, from an annual root, erect or decumbent at the base, somewhat flattened, smooth. Sheaths loose, usually overlapping; ligule about 1″ long; leaves ½′–4′ long, ¾″–1½″ wide, smooth; panicle ½′–4′ in length, open, branches spreading, ¼′–1½′ long, naked at the base; spikelets 3–5-flowered, 1½″–2½″ long; lower scales smooth, the first narrow, acute, 1-nerved, about two thirds as long as the broad and obtuse 3-nerved second one; flowering scales 1¼″–1½″ long, distinctly 5-nerved, the nerves pilose below.

In waste and cultivated places nearly throughout North America. Naturalized from Europe. Native also of Asia. May–Oct.

2. Poa Chapmaniàna Scribn. Chapman's Spear-grass. (Fig. 460.)

Poa cristata Chapm. Fl. S. States, 562. 1860. Not Walt. 1788.

Poa Chapmaniana Scribn. Bull. Torr. Club, 21: 38. 1894.

Culms 3′–6′ tall, erect from an annual root, simple, rigid, smooth and glabrous. Sheaths tight, mostly at the base of the culm; ligule ½″ long, truncate; leaves ½′–1′ long, ½″ wide or less, smooth; panicle 1′–2′ in length, the branches usually erect, sometimes spreading or ascending, ¾′ long or less, naked at the base; spikelets 3–7-flowered, 1¼″–1½″ long; lower scales about equal, 3-nerved, acute; flowering scales webbed at the base, obtuse, 3-nerved, sometimes with two additional obscure nerves, the prominent ones sometimes pilose for three-fourths their length.

In dry soil, Kentucky and Tennessee to Florida and Alabama. April–May.

3. Poa compréssa L. Wire-grass. Flat-stemmed Meadow-grass. English Blue-grass. (Fig. 461.)

Poa compressa L. Sp. Pl. 69. 1753.

Pale bluish-green, glabrous, culms 6′–2° tall, decumbent at the base, from long horizontal rootstocks, smooth, much flattened. Sheaths loose, flattened, shorter than the internodes; ligule ½″ long; leaves 1′–4′ long, about 1″ wide, smooth beneath, rough above; panicle usually contracted, the branches erect or ascending, 1′ long or less, spikelet-bearing nearly to the base; spikelets 3–9-flowered, 1½″–3″ long; lower scales acute, 3-nerved; flowering scales 1″–1¼″ long, obscurely 3-nerved, the nerves sparingly pubescent toward the base.

Waste places and cultivated grounds and woods almost throughout North America. Ascends to 2100 ft. in Virginia. Naturalized from Europe. Native also of Asia. Varies from weak and slender to quite stiff. June–Aug.

4. Poa abbreviàta R. Br. Low Spear-grass. (Fig. 462.)

Poa abbreviata R. Br. Bot. App. Parry's Voy. 287. 1824.

Culms 6′ tall or less, erect, simple, smooth and glabrous. Sheaths and leaves crowded at the base of the culm; ligule ½″ long; leaves ½′–1′ long, ½″ wide; panicle contracted, ½′–1′ long, branches very short and erect; spikelets 3–5-flowered, 2½″ long; lower scales acute, smooth and glabrous; flowering scales about 1½″ long, obtuse, strongly pubescent all over, the intermediate nerves very obscure.

Arctic America from Greenland and Labrador to the Pacific. Summer.

5. Poa láxa Haenke. Wavy Meadow-grass. Mountain Spear-grass. (Fig. 463.)

Poa laxa Haenke, in Jirasek, Beob. Riesengeb. 118. 1791.

Smooth and glabrous, culms 1° tall or less, erect, simple. Sheaths often overlapping; ligule about 1″ long; leaves 1′–3′ long, ½″–1″ wide, acuminate; panicle 1′–3′ in length, the branches usually erect, sometimes ascending, 1′ long or less; spikelets 3–5-flowered, 2″–2½″ long; lower scales usually 3-nerved, acute, glabrous, rough on the keel at its apex; flowering scales 1½″–1¾″ long, obtuse, 3-nerved, or sometimes with an additional pair of obscure nerves, the midnerve pilose on the lower half, rough above, the lateral ones pilose for one-third their length.

Greenland to Alaska, south to the mountains of New England, to Manitoba and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

6. Poa alpina L. Alpine Spear-grass. (Fig. 464.)

Poa alpina L. Sp. Pl. 67. 1753.

Smooth and glabrous, culms 4′–18′ tall, erect, simple. Sheaths shorter than the internodes; ligule 1″ long, truncate; leaves 1′–3′ long, 1″–2″ wide, abruptly acute; panicle 1′–3′ in length, the branches generally widely spreading, 1′ long or less; spikelets 3–5-flowered, 2½″–3″ long; lower scales broad, glabrous, rough on the keel, acute; flowering scales about 2″ long, obtuse, pilose for half their length, pubescent between the nerves toward the base.

Labrador to Alaska, south to Quebec, Lake Superior, and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

7. Poa cenísia All. Arctic Spear-grass. (Fig. 465.)

Poa cenisia All. Auct. Fl. Ped. 40. 1789.

Smooth and glabrous, culms 4′–15′ tall, erect, slender, simple. Sheaths shorter than the internodes; ligule 1″ long or less, truncate; leaves 1′–4′ long, ½″–1″ wide; panicle 1′–4′ in length, open, the branches generally widely spreading and more or less flexuous, 1′–2½′ long; spikelets 3–5-flowered, 2½″–3½″ long; lower scales acute or acuminate, 1–3-nerved; flowering scales about 2″ long, faintly 5-nerved, the nerves short-pilose on the lower half, minutely pubescent between the nerves, somewhat webbed at the base.

Greenland and Labrador to Alaska. Also in Europe. Summer.

8. Poa praténsis L. Kentucky Blue-grass. June Grass. (Fig. 466.)

Poa pratensis L. Sp. Pl. 67. 1753.
Poa pratensis var. *angustifolia* Kunth, Enum. 1: 353. 1833.

Glabrous, culms 1°–4° tall, from long running rootstocks, erect, simple, smooth. Sheaths often longer than the internodes; ligule ¾″ long or less, truncate; leaves smooth or rough, ½″–3″ wide, those of the culm 2′–6′ in length, the basal much longer; panicle 2½′–8′ in length, usually pyramidal, the branches spreading or ascending, sometimes flexuous, 1′–3′ long, divided and spikelet-bearing above the middle; spikelets 3–5-flowered, 2″–2½″ long, exceeding their pedicels; scales acute, the lower unequal, glabrous, rough on the keel, the lower 1-nerved, the upper 3-nerved; flowering scales 1½″ long, webbed at the base, 5-nerved, the marginal nerves and midnerve silky-pubescent below, the intermediate ones naked.

In meadows, fields and woods, almost throughout North America. Widely cultivated for hay and pasture. Also in Europe and Asia. In North America probably indigenous only in the northern and mountainous regions. Variable. June–Aug.

9. Poa pseudopraténsis Scribn. & Ryd. Prairie Meadow-grass. (Fig. 467.)

Culms 1°–2½° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly rough; ligule 2″ long, acute, decurrent; leaves 1″–3″ wide, smooth beneath, a little rough above and on the margins, those of the culm 1′–3½′ long, the basal 6′–10′ in length; panicle 2′–5′ long, open, the branches spreading or ascending, 1′–2′ long; spikelets 3–5-flowered, 3″–4″ long, exceeding their pedicels; lower scales nearly equal, acute, 3-nerved; flowering scales acutish, about 1½″ long, rough above, 5-nerved, pubescent between the nerves below, the marginal nerves and midnerve silky-pubescent about half their length.

Manitoba and Assiniboia to Nebraska and Colorado.

10. Poa triviàlis L. Roughish Meadow-grass. (Fig. 468.)

Poa trivialis L. Sp. Pl. 67. 1753.

Culms 1°–3° tall, usually more or less decumbent at the base, simple, smooth or slightly scabrous. Sheaths usually shorter than the internodes, rough; ligule 2″–3″ long, acutish; leaves 2′–7′ in length, 1″–2″ wide, generally very rough; panicle 4′–6′ long, open, the branches usually spreading or ascending, 1′–2′ long; spikelets 2- or sometimes 3-flowered, 1½″ long, exceeding their pedicels; scales acute, the empty basal ones rough on the keel, the lower 1-nerved, shorter than the 3-nerved upper; flowering scales 1″–1½″ long, webbed at the base, 5-nerved, the midnerve silky-pubescent below, the lateral nerves naked, the intermediate ones prominent.

In meadows and waste places, New Brunswick to Michigan and Virginia. Naturalized from Europe. June–Aug.

11. Poa glaùca Vahl. Glaucous Spear-grass. (Fig. 469.)

Poa glauca Vahl, Fl. Dan. *pl. 964.* 1790.
Poa caesia J. E. Smith, Eng. Bot. *pl. 1719.* 1807.

Culms 6′–2° tall, erect, simple, rigid, glabrous, somewhat glaucous. Sheaths overlapping, confined to the lower half of the culm; ligule 1″ long; leaves 1′–2′ long, 1″ wide or less, smooth beneath, scabrous above; panicle 1′–3′ in length, open, the branches erect or ascending, ½′–1½′ long; spikelets 2–4-flowered, 2½″–3″ long; empty basal scales acute, 3-nerved, glabrous, rough on the upper part of the keel; flowering scales 1½″–1¾″ long, obtuse or acutish, rough, not webbed at the base, the lower half of the midnerve and marginal nerves silky-pubescent, the intermediate nerves obscure and occasionally sparingly pubescent at the base.

White Mountains of New Hampshire. Also in Europe. Summer.

12. Poa nemoràlis L. Wood Meadow-grass. Northern Spear-grass. (Fig. 470.)

Poa nemoralis L. Sp. Pl. 69. 1753.
Poa caesia var. *strictior* A. Gray, Man. Ed. 5, 629. 1867.

Culms 6′–2° tall, erect, simple, slender, sometimes rigid, smooth and glabrous. Sheaths usually shorter than the internodes; ligule ½″–1″ long, truncate; leaves 1′–4′ long, 1″ wide or less, erect, smooth or rough; panicle 2′–5′ in length, open, the branches erect or ascending, rarely spreading, 1′–2′ long; spikelets 2–5-flowered, 1½″–2½″ long; lower scales acute or acuminate, 1–3-nerved; flowering scales obtuse or acute, 1″–1¼″ long, faintly 5-nerved, somewhat webby at base, the midnerve and the marginal nerves silky-pubescent on the lower half.

Anticosti Island to British Columbia, south to Maine, Minnesota, South Dakota, and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

13. Poa flàva L. False Red-top. Fowl Meadow-grass. (Fig. 471.)

Poa flava L. Sp. Pl. 68. 1753.
Poa serotina Ehrh. Beitr. 6: 83. 1791.

Culms 1½°–5° tall, erect, simple or rarely branched, smooth, glabrous. Sheaths usually shorter than the internodes, smooth and glabrous; ligule 1″–2″ long; leaves 2′–6′ long, 1″–2″ wide, smooth or rough; panicle 6′–13′ in length, open, the branches spreading or ascending, 2′–5′ long, divided and spikelet-bearing above the middle; spikelets 3–5-flowered, 1½″–2″ long, exceeding their pedicels; lower scales acute, glabrous, rough above on the keel, the lower usually 1-nerved, the upper 3-nerved; flowering scales obtuse, somewhat webby at the base, 1″–1½″ long, silky-pubescent on the lower half of the marginal nerves and the midnerve, the intermediate nerves obscure or wanting.

In swampy places, Nova Scotia and New Brunswick to Vancouver Island, south to New Jersey, Illinois and Nebraska. Also in Europe and Asia. July–Aug.

14. Poa débilis Torr. Weak Spear-grass. (Fig. 472.)

Poa debilis Torr. Fl. N. Y. 2: 459. 1843.

Culms 1°–2½° tall, erect, slender, simple, somewhat flattened, smooth and glabrous. Sheaths compressed, much shorter than the internodes; ligule ½″–1″ long; leaves 1′–4½′ long, 1″ wide or less, erect, smooth beneath, rough above; panicle 2′–6′ in length, open, often nodding at the top, the branches erect or ascending, sometimes spreading, 1½′–3′ long; spikelets 2–4-flowered, 1½″–2″ long, their pedicels longer; empty scales unequal, acute, the first 1-nerved, shorter than the 3-nerved second one; flowering scales 1½″ long, obtuse, sparingly webbed at the base, 5-nerved, the nerves naked.

In woods, Nova Scotia and New Brunswick to Ontario and Minnesota, south to Rhode Island, Pennsylvania and Wisconsin. June–Aug.

15. Poa autumnàlis Muhl. Flexuous Spear-grass. (Fig. 473.)

Poa autumnalis Muhl.; Ell. Bot. S. C. & Ga. 1: 159. 1817.
Poa flexuosa Muhl. Gram. 148. 1817. Not J. E. Smith. 1803.

Culms 1°–3° tall, erect, slender, simple, smooth and glabrous. Sheaths usually much shorter than the internodes; ligule ½″ long; leaves 1″ wide or less, smooth beneath, rough above, those of the culm 1½′–6′ long, the basal much longer; panicle 3′–9′ in length, the branches long and slender, spikelet-bearing at the extremities, 2′–5′ long; spikelets 3–5-flowered, 2½″–3″ long; empty basal scales acute, the first 1-nerved, narrow, shorter than the broad 3-nerved second; flowering scales rounded or retuse at the apex, 1½″–2″ long, not webbed at the base, pubescent on the lower part, 5-nerved, the midnerve silky-pubescent for three-fourths its length.

In woods, New Jersey and Pennsylvania to Kentucky, south to Florida and Texas. March–May.

16. Poa sylvéstris A. Gray. Sylvan Spear-grass. (Fig. 474.)

Poa sylvestris A. Gray, Man. 596. 1848.

Culms 1°–3° tall, erect, slender, simple, slightly flattened, smooth, glabrous. Sheaths shorter than the internodes; ligule ½″ long or less; leaves smooth beneath, rough above, 1″–3″ wide, those of the culm 1½′–6′ in length, the basal much longer; panicle 3′–7′ in length, the branches spreading or ascending, 1½–3′ long, spikelet-bearing at the extremities; spikelets 2–4-flowered, 1″–2″ long; empty basal scales acute, the lower 1-nerved, the upper longer and 3-nerved; flowering scales about 1¼″ long, webbed at the base, obtuse, often pubescent below, 5-nerved, the midnerve pubescent nearly its entire length and the marginal nerves below the middle.

In thickets and meadows, New York to Wisconsin, south to North Carolina, Louisiana and Kansas. Branches of the panicle sometimes reflexed when old. June–July.

17. Poa alsòdes A. Gray. Grove Meadow-grass. (Fig. 475.)

Poa alsodes A. Gray, Man. Ed. 2, 562. 1856.

Culms 8′–2½° tall, erect, slender, simple, smooth and glabrous. Sheaths usually longer than the internodes; ligule ½″ long; leaves usually rough, 1″–2″ wide, those of the culm 2′–8′ in length, the basal longer; panicle 3½′–8′ in length, the branches spreading or ascending, 1½′–3′ long, spikelet-bearing at the ends; spikelets 2–3-flowered, about 2½″ long; scales very acute, the empty basal ones unequal, the lower 1-nerved, the upper 3-nerved; flowering scales about 2″ long, webbed at the base, the midnerve pubescent near the base, the marginal nerves naked, the intermediate ones very faint.

In woods and thickets, Nova Scotia to Ontario and Minnesota, south to North Carolina and Tennessee. May–June.

18. Poa Wòlfii Scribn. Wolf's Spear-grass. (Fig. 476.)

Poa Wolfii Scribn. Bull. Torr. Club, 21: 228. 1894.

Culms 2°–3° tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ½″ long; leaves 1″ wide or less, smooth beneath, rough above, those of the culm 2′–4′ in length, the basal much longer; panicle 3′–6′ in length, lax, its branches erect or ascending, flexuous, 1½′–2½′ long; spikelets 2–4-flowered, 2½″–3″ long; scales acute, the lower unequal, 3-nerved, glabrous, rough on the keel, the first shorter than the second; flowering scales about 2″ long, copiously webbed at the base, 5-nerved, the marginal and midnerves silky-pubescent for more than half their length, the intermediate nerves prominent, naked.

Illinois, Tennessee and Kansas.

19. Poa brevifòlia Muhl. Short-leaved Spear-grass. (Fig. 477.)

Poa brevifolia Muhl. Gram. 138. 1817.

Culms 1°–3° tall, erect or spreading, slender, smooth, glabrous. Sheaths often shorter than the internodes; ligule ½″–1½″ long; leaves smooth beneath, rough above, 1″–2″ wide, abruptly acute, those of the culm ½′–4′ long, the uppermost sometimes almost wanting; basal leaves usually equalling or nearly as long as the culm; panicle 2½′–5′ in length, open, the branches ascending, widely spreading or often reflexed, 1½′–3′ long, spikelet-bearing at the ends; spikelets 3–6-flowered, 2½″–3½″ long; empty basal scales unequal, acute, glabrous, the lower 1-nerved, the upper 3-nerved; flowering scales slightly webbed at the base, 2″–2½″ long, obtuse, 5-nerved, the keel and marginal nerves sparingly pubescent, the intermediate nerves prominent, naked.

In rocky woods, New Jersey and Pennsylvania to Illinois, south to North Carolina and Tennessee. April–June.

20. Poa árida Vasey. Prairie Spear-grass. (Fig. 478.)

Poa andina Nutt.; S. Wats. Bot. King's Exp. 388. 1871. Not Trin. 1836.
Poa arida Vasey, Contr. U. S. Nat. Herb. 1: 270. 1893.

Culms 1°–2° tall, erect, rigid, simple, smooth and glabrous. Sheaths usually overlapping, smooth or somewhat roughish; ligule 1″–2″ long, acute; leaves smooth beneath, rough above, ½″–1″ wide, flat or folded, pungently pointed, those of the culm ½′–1′ long, erect, the basal leaves 3′–6′ long; panicle contracted, 2′–5′ in length, the branches erect, spikelet-bearing nearly to the base, 1½′ long or less; spikelets 4–7-flowered, 2½″–3½″ long; lower scales nearly equal, acute, 3-nerved; flowering scales 1½″–2″ long, erose-truncate at apex, strongly silky-pubescent on the nerves for half their length, the lower part very pubescent between the nerves; intermediate nerves very obscure.

On prairies, Kansas to Utah, north to British America. July–Sept.

21. Poa Buckleyàna Nash. Buckley's Spear-grass. (Fig. 479.)

Poa tenuifolia Buckley, Proc. Acad. Phila. 1862: 96. 1862. Not A. Rich. 1851.
Poa Buckleyana Nash, Bull. Torr. Club, 22: 465. 1895.

Culms 6′–2° tall, erect, rigid, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 2″–3″ long, acute; leaves 1′–4′ long, about 1″ wide, erect, flat, or becoming involute, smooth or rough; panicle 1′–4′ in length, contracted, the branches erect, 1½′ long or less, spikelet-bearing nearly to the base; spikelets 2–5-flowered, 2″–3″ long; scales acute, the lower nearly equal, scabrous on the keel; flowering scales about 2″ long, obtuse or acutish, sparingly pubescent on the nerves below, sometimes slightly hispid toward the base between the nerves.

Kansas to California, north to British America. July–Aug.

22. Poa glumàris Trin. Large-flowered Spear-grass. (Fig. 480.)

Poa glumaris Trin. Mem. Acad. St. Petersb. (VI.) 1: 379. 1831.

Smooth and glabrous, culms 6′–3° tall, erect or assurgent, simple. Sheaths loose, usually shorter than the internodes; ligule ½″ long, truncate; leaves 4′–10′ long, 1″–4″ wide; panicle 4′–10′ in length, the branches erect or ascending, 1′–2′ long; spikelets 3–5-flowered, 4″–6″ long; lower scales about equal, acute, slighty scabrous on the keel, the first 1–3-nerved, the second 3-nerved, rarely 5-nerved; flowering scales 3″–4″ long, usually acutish, scabrous, 5–7-nerved, pubescent at base and on the lower part of the midnerve and lateral nerves, not webbed.

Anticosti Island and Nova Scotia to Quebec and Alaska. Summer.

78. DUPÓNTIA R. Br. Parry's Voy. App. 290. 1824.

Low grasses, with flat leaves and generally narrow panicles. Spikelets 2–4-flowered, the flowers all perfect. Two lower scales empty, extending beyond the flowering scales, membranous; flowering scales entire, membranous, with a tuft of hairs at the base. Stamens 3. Styles distinct. Stigmas plumose. [Name in honor of J. D. Dupont, French botanist.]

Two arctic species, both circumboreal.

1. Dupontia Fisheri R. Br. Fisher's Dupontia. (Fig. 481.)

Dupontia Fisheri R. Br. Parry's Voy. App. 291. 1824.

Smooth and glabrous, culms 5′–12′ tall, erect, simple. Sheaths overlapping; ligule 1″ long or less; leaves 1′–6′ long, 1″–2″ wide, flat; panicle usually contracted, 1½′–3½′ long, the branches less than 1½′ long, erect, or sometimes ascending; spikelets few, about 2-flowered, 3″–4″ long; empty basal scales thin, generally acute, the first 1-nerved, somewhat shorter than the second, which is usually 3-nerved, the lateral nerves often vanishing at about the middle; flowering scales 2½″–3″ long, 1-nerved or obscurely 3-nerved; basal hairs about ½″ long.

Arctic regions of northeastern America. Also in arctic Europe and Asia. Summer.

79. SCOLÓCHLOA Link, Hort. Berol. 1: 136. 1827.

Tall aquatic or marsh grasses, with flat leaves and ample panicles. Spikelets 2–4-flowered, the flowers perfect. Two lower scales empty, thin-membranous, 3–5-nerved; flowering scales rigid, with a tuft of hairs at the base, rounded on the back, 5–7-nerved, some of the nerves usually excurrent as short points; palets about equalling the scales, 2-nerved. Stamens 3. Styles very short. Stigmas plumose. Grain hairy at the apex. [Greek, referring to the rickle-like projecting nerves of the flowering scales.]

Species 2, in the north temperate zones of both continents.

1. Scolochloa festucàcea (Willd.) Link. Fescue Scolochloa. (Fig. 482.)

Arundo festucacea Willd. Enum. 1: 126. 1809.

Scolochloa festucacea Link, Hort. Berol. 1: 137. 1827.

Graphephorum festucaceum A. Gray, Ann. Bot. Soc. Can. 1: 57. 1861.

Culms 3°–5° tall, erect, smooth and glabrous. Sheaths often overlapping; ligule 1″–2″ long; leaves 7′–1° long or more, 2″–4″ wide, flat, scabrous on the margins; panicle 8′–12′ in length, usually open, the branches ascending, naked at the base, the lower 3′–4′ long; spikelets 3″–4″ long; empty basal scales acute, the first shorter than the second; flowering scales scabrous, 7-nerved.

Iowa and Nebraska, north to Manitoba and Assiniboia. July–Aug.

80. GRAPHÉPHORUM Desv. Bull. Soc. Philom. 2: 189. 1810.

Slender erect grasses, with flat leaves and a usually contracted nodding panicle. Spikelets 2–4-flowered, flattened, the rachilla hirsute and extending beyond the flowers. Two lower scales empty, somewhat shorter than the flowering scales, thin-membranous, acute, keeled; flowering scales membranous, obscurely nerved, entire, sometimes short-awned just below the apex. Stamens 3. Styles distinct. Stigmas plumose. Grain glabrous. [Greek, pencil-bearing, referring to the tuft of hairs at the end of the rachilla.]

Two known species, natives of northern North America. Other Mexican grasses are referred to this genus by authors.

1. Graphephorum melicoìdeum (Michx.) Beauv. Graphephorum.

(Fig. 483.)

Aira melicoides Michx. Fl. Bor. Am. 1: 62. 1803.
Graphephorum melicoideum Beauv. Agrost. 164. *pl. 15. f. 8.* 1812.
Dupontia Cooleyi A. Gray, Man. Ed. 2, 556. 1852.
Graphephorum melicoides var. *major* A. Gray, Ann. Bot. Soc. Can. 1: 57. 1861.

Culms 1°–2½° tall, erect, simple, rough just below the panicle. Sheaths usually shorter than the internodes, smooth, or the lower often villous; ligule 1″ long or less, truncate; leaves 1½′–9′ long, 1‴–2″ wide, long-acuminate, rough; panicle 2′–6′ in length, the top usually nodding, the branches erect, 1′–2′ long; spikelets 2–4-flowered, 2½″–3″ long; scales scabrous on the keel, the empty ones unequal, the first 1-nerved or obscurely 3-nerved, shorter than the 3-nerved second; flowering scales 3–5-nerved, acute.

In wet soil, Anticosti Island to Ontario, south to Maine and Michigan. Aug.–Sept.

81. PANICULÀRIA Fabr. Enum. Hort. Helmst. 373. 1763.

[Glyceria R. Br. Prodr. Fl. Nov. Holl. 1: 179. 1810.]

Mostly perennial grasses, often tall, with flat leaves and paniculate inflorescence. Spikelets few–many-flowered, terete or somewhat flattened. Two lower scales empty, obtuse or acute, 1–3-nerved; flowering scales membranous, rounded on the back, 5–9-nerved, the nerves disappearing in the hyaline apex. Palets scarcely shorter than the scales, rarely longer, 2-keeled. Stamens 2 or 3. Styles distinct. Stigmas plumose. Grain smooth, enclosed in the scale and palet, free, or when dry slightly adhering to the latter. [Latin, referring to the panicled spikelets.]

About 16 species, widely distributed in North America, a few in Europe and Asia.

Spikelets ovate or oblong, 4″ long or less.
  Flowering scales very broad, obscurely or at least not sharply nerved.
    Panicle open, the branches ascending or spreading, often drooping.
      Spikelets 3–5-flowered; lowest flowering scale about 1″ long. 1. *P. laxa.*
      Spikelets 5–12-flowered; lowest flowering scale about 1½″ long. 2. *P. Canadensis.*
    Panicle contracted, the branches erect. 3. *P. obtusa.*
  Flowering scales narrow, sharply and distinctly 7-nerved.
    Panicle elongated, its branches erect or appressed. 4. *P. elongata.*
    Panicle not elongated, open, its branches spreading or drooping, rarely erect.
      Scales about 1″ long, obtuse or rounded at the apex.
        Spikelets 1½″ long or less; branches of the panicle often drooping. 5. *P. nervata.*
        Spikelets 2″–3″ long; branches of the panicle ascending or spreading. 6. *P. Americana.*
      Scales 1¼″–1½″ long, truncate and denticulate at the apex. 7. *P. pallida.*
Spikelets linear, 6″ long or more.
  Flowering scales 1½″–3″ long, obtuse, longer than the obtuse palet. 8. *P. fluitans.*
  Flowering scales about 4″ long, acute, much shorter than the long-acuminate palet. 9. *P. aculiflora.*

1. Panicularia láxa Scribn. Northern Manna-grass. (Fig. 484.)

Panicularia laxa Scribn. Bull. Torr. Club, 21: 37. 1894.

Glyceria laxa Scribn.; Redf. & Rand, Fl. Mt. Desert, 180. 1894.

Culms 2°–4° tall, erect, simple, smooth or slightly scabrous. Sheaths overlapping, rough; ligule ½″–1″ long; leaves 8′–15′ long, 2″–4″ wide, very rough; panicle 7′–9′ in length, the branches spreading or ascending, the lower 3′–6′ long; spikelets 3–5-flowered, about 2″ long; empty scales unequal, scarious, acute, 1-nerved, the first one-half to two-thirds the length of the second; flowering scales broad, about 1″ long, twice the length of the second scale, obtuse, obscurely 7-nerved.

In water or wet soil, Maine to Pennsylvania. Aug.

2. Panicularia Canadénsis (Michx.) Kuntze. Rattlesnake Grass. (Fig. 485.)

Briza Canadensis Michx. Fl. Bor. Am. 1: 71. 1803.

Glyceria Canadensis Trin. Mem. Acad. St. Petersb. (VI.) 1: 366. 1831.

Panicularia Canadensis Kuntze, Rev. Gen. Pl. 783. 1891.

Culms 2°–3° tall, erect, simple, smooth or slightly scabrous. Sheaths shorter than the internodes, those at the base of the culm overlapping; ligule 1″ long, truncate; leaves 6′–1° long or more, 2″–4″ wide, rough; panicle 5½′–10′ in length, the branches spreading, ascending or often drooping, 2½′–5′ long; spikelets 5–12-flowered, 2½″–4″ long, flattened, turgid; empty scales unequal, acute, 1-nerved; flowering scales, broad, 1½″–2″ long, obtuse or acutish, obscurely 7-nerved.

In swamps and marshes, Newfoundland and New Brunswick to Ontario and Minnesota, south to New Jersey, Ohio and Kansas. The handsomest species of the genus. Ascends to 5000 ft. in the Adirondacks. July–Aug.

3. Panicularia obtùsa (Muhl.) Kuntze. Blunt Manna-grass. (Fig. 486.)

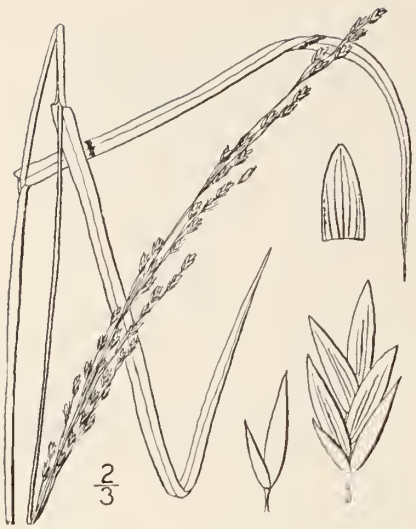
Poa obtusa Muhl. Gram. 147. 1817.

Glyceria obtusa Trin. Mem. Acad. St. Petersb. (VI.) 1: 366. 1831.

Panicularia obtusa Kuntze, Rev. Gen. Pl. 783. 1891.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths sometimes rough, strongly striate, the lower overlapping; ligule very short; leaves 6′–15′ long, 2″–4″ wide, usually stiff, erect or ascending, smooth beneath, more or less scabrous above; panicle 3′–8′ in length, contracted, dense, the branches erect; spikelets 3–7-flowered, 2″–3″ long; empty scales acute, scarious, 1-nerved; flowering scales about 1½″ long, broad, obtuse, obscurely 7-nerved.

In swamps, New Brunswick to New York and central Pennsylvania, south to Delaware and Maryland. Ascends to 2300 ft. in the Catskill Mountains. July–Aug.



4. Panicularia elongàta (Torr.) Kuntze. Long Manna-grass. (Fig. 487.)

Poa elongata Torr. Fl. U. S. 1: 112. 1824.
Glyceria elongata Trin. Bull. Acad. Sci. St. Petersb. 1: 68. 1836.
Panicularia elongata Kuntze, Rev. Gen. Pl. 783. 1891.

Culms 2°–3° tall, erect, simple, slender, smooth and glabrous. Sheaths often shorter than the internodes; ligule ¼″ long; leaves lax, 6′–12′ long, 1½″–3″ wide, long-acuminate, smooth beneath, rough above; panicle elongated, contracted, narrow, usually nodding at the summit, 6′–12′ in length, the branches erect or appressed, 1′–2½′ long; spikelets 3–4-flowered, 1½″–2″ long; empty scales unequal, acute, 1-nerved; flowering scales narrow, about 1″ long, obtuse or acutish, distinctly 7-nerved.

In wet woods, Newfoundland to Quebec and Minnesota, south to North Carolina and Kentucky. Ascends to 4000 ft. in the Adirondacks. Aug.–Sept.

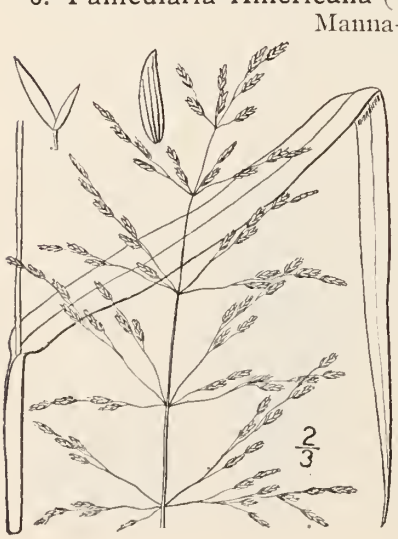
5. Panicularia nervàta (Willd.) Kuntze. Nerved Manna-grass. (Fig. 488.)

Poa nervata Willd. Sp. Pl. 1: 389. 1798.
Glyceria nervata Trin. Mem. Acad. St. Petersb. (VI.) 1: 365. 1831.
Panicularia nervata Kuntze, Rev. Gen. Pl. 783. 1891.

Culms 1°–3° tall, erect, slender, simple, smooth and glabrous. Sheaths often shorter than the internodes, usually more or less rough; ligule ½″ long, truncate; leaves 6′–12′ long, 2″–5″ wide, acute, smooth beneath, rough above; panicle 3′–8′ in length, open, the branches filiform, spreading, ascending or often drooping, rarely erect, 2′–5′ long; spikelets 3–7-flowered, 1″–1½″ long; empty scales obtuse, 1-nerved; flowering scales about ¾″ long, obtuse or rounded, with 7 sharp distinct nerves and evident furrows between.

In wet places, Newfoundland to British Columbia, south to Florida and Mexico. Ascends to 4000 ft. in Virginia. Panicle often purple. June–Sept.

6. Panicularia Americàna (Torr.) MacM. Reed Meadow-grass. Tall Manna-grass. (Fig. 489.)



Poa aquatica var. *Americana* Torr. Fl. U. S. 1: 108. 1824.
Glyceria grandis S. Wats. in A. Gray, Man. Ed. 6, 667. 1890.
Panicularia Americana MacMillan, Met. Minn. 81. 1892.

Culms 3°–5° tall, erect, stout, simple, smooth and glabrous. Sheaths loose, smooth, or sometimes rough; ligule 1″–2″ long, truncate; leaves 7′–1° long or more, 3″–8″ wide, usually smooth beneath, rough above; panicle 8′–15′ in length, its branches spreading, ascending or rarely erect, 4′–8′ long; spikelets 4–7-flowered, 2″–3″ long; empty scales acute, 1-nerved; flowering scales about 1″ long, obtuse or rounded at the apex, sharply and distinctly 7-nerved, the furrows between the nerves evident.

In wet soil, New Brunswick to Alaska, south to Tennessee, Nebraska, Colorado and Nevada. Ascends to 2100 ft. in Pennsylvania. June–Aug.

7. Panicularia pállida (Torr.) Kuntze. Pale Manna-grass. (Fig. 490.)

Windsoria pallida Torr. Cat. N. Y. 91. 1819.
Glyceria pallida Trin. Bull. Acad. Sci. St. Petersb. 1: 68. 1836.
Panicularia pallida Kuntze, Rev. Gen. Pl. 783. 1891.

Pale green, culms 1°–3° long, assurgent, simple, smooth and glabrous. Sheaths loose, shorter than the internodes; ligule 2″–3″ long, acute; leaves 2′–6′ long, 1″–2″ wide, smooth beneath, rough above; panicle 1½′–7′ in length, the branches spreading, ascending or rarely erect, often flexuous, 1′–2′ long; spikelets 4–8-flowered, 2½″–3½″ long; empty scales unequal, the first 1-nerved, obtuse, shorter than the 3-nerved and truncate second; flowering scales 1¼″–1½″ long, truncate and denticulate at the apex, sharply and distinctly 7-nerved, with plain furrows between the nerves.

In shallow water, New Brunswick to Ontario, south to Virginia, Tennessee and Indiana. Ascends to 2000 ft. in Pennsylvania. July–Aug.

8. Panicularia flùitans (L.) Kuntze. Floating Manna-grass. (Fig. 491.)

Festuca fluitans L. Sp. Pl. 75. 1753.
Glyceria fluitans R. Br. Prodr. Fl. Nov. Holl. 1:179. 1810.
Panicularia fluitans Kuntze, Rev. Gen. Pl. 782. 1891.

Culms 2°–5° long, flattened, erect or decumbent, usually stout, simple, smooth and glabrous, often rooting from the lower nodes. Sheaths loose, generally overlapping, smooth or rough; ligule 2″–3″ long; leaves 5′–1° long or more, 2″–6″ wide, scabrous, often floating; panicle 9′–1½° long, the branches, at least the lower ones, at first appressed, later ascending, and 3′–6′ long; spikelets linear, 7–13-flowered, 4″–12″ long; empty scales unequal, 1-nerved, the lower acute or obtuse, the upper obtuse or truncate; flowering scales 1½″–3″ long, oblong, obtuse or truncate, more or less scabrous, sharply 7-nerved.

In wet places or in water, Newfoundland to British Columbia, south to New Jersey, Kentucky, Iowa and California. Also in Europe. July–Sept.

9. Panicularia acutiflòra (Torr.) Kuntze. Sharp-scaled Manna-grass. (Fig. 492.)

Glyceria acutiflora Torr. Fl. U. S. 1: 104. 1824.
Panicularia acutiflora Kuntze, Rev. Gen. Pl. 782. 1891.

Culms 1°–2° tall, flattened, erect from a decumbent base, simple, smooth and glabrous. Sheaths loose, generally a little exceeding the internodes, smooth and glabrous; ligule 2″ long, truncate; leaves 3′–6′ long, 2″–3″ wide, smooth beneath, rough above; panicle 6′–12′ in length, the branches erect or appressed, 2′–4′ long; spikelets linear, 5–12-flowered, 1′–1¾′ long; empty scales acute, smooth; flowering scales about 4″ long, lanceolate, acute, scabrous, exceeded by the long-acuminate palets.

In wet places, Maine to southern New York, Ohio and Tennessee. Local. June–Aug.

82. PUCCINÉLLIA Parl. Fl. Ital. 1: 366. 1848.

Perennial grasses, with flat or involute leaves and contracted or open panicles. Spikelets 3–several-flowered. Lower scales empty, obtuse or acute, unequal; flowering scales obtuse or acute, rounded on the back, 5-nerved, the nerves very obscure or almost wanting. Palet about equalling the scale. Stamens 3. Styles wanting. Stigmas sessile, simply plumose. Grain compressed, usually adhering to the palet. [Name in honor of Benedetto Puccinelli, Italian botanist.]

About 14 species, in all temperate regions.

Panicle open, its branches spreading or ascending, rarely erect.
- Lower flowering scales 1½″–2″ long; plant stoloniferous. 1. *P. maritima.*
- Lower flowering scales 1¼″ long or less; plants not stoloniferous.
  - Second empty scale less than half the length of the flowering scales, broad, obtuse or truncate; spikelets crowded. 2. *P. distans.*
  - Second empty scale more than half the length of the flowering scales, narrow, obtuse or acute; spikelets not crowded. 3. *P. airoides.*

Panicle contracted, its branches erect, rarely ascending; northern species. 4. *P. angustata.*

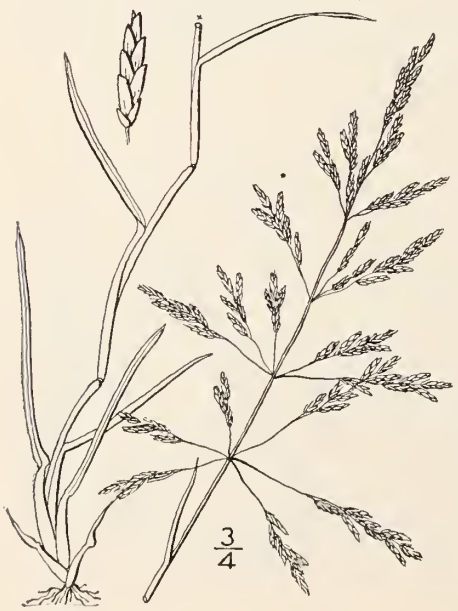
1. Puccinellia marítima (Huds.) Parl. Goose-grass. Sea Spear-grass. (Fig. 493.)

Poa maritima Huds. Fl. Angl. 35. 1762.
Glyceria maritima M. & K. Deutsch. Fl. 1: 588. 1823.
Puccinellia maritima Parl. Fl. Ital. 1: 370. 1848.

Stoloniferous, smooth, glabrous, culms 6′–2° tall, erect, or decumbent at the base, simple. Sheaths usually exceeding the internodes; ligule ½″–1″ long; leaves ½′–5′ long, 1″ wide or less, flat to involute; panicle 2′–6′ in length, open, the branches ascending, or rarely erect, 1′–2′ long; spikelets 3–10-flowered, 3″–6″ long; empty scales unequal, the first usually 1-nerved, the second 3-nerved; flowering scales 1½″–2″ long, broad, obtuse or truncate.

In salt marshes and on sea beaches, Nova Scotia to Rhode Island. Also on the Pacific coast, and on the coasts of Europe and Asia. uly–Aug.

2. Puccinellia distans (L.) Parl. Spreading Meadow-grass. (Fig. 494.)



Poa distans L. Mant. 32. 1767.
Glyceria distans Wahl. Fl. Ups. 36. 1820.
Puccinellia distans Parl. Fl. Ital. 1: 367. 1848.

Culms 1°–2° tall, erect, or sometimes decumbent at the base, tufted, smooth and glabrous. Sheaths often shorter than the internodes, smooth and glabrous; ligule ½″–1″ long; leaves ½′–6′ long, 1″–2″ wide, flat or folded, usually stiff and erect, smooth beneath; panicle 2′–7′ in length, open, rarely contracted, the branches spreading or ascending, whorled, the lower 1′–4½′ long, sometimes reflexed; spikelets crowded, 3–6-flowered, 1½″–2½″ long; empty scales obtuse or acute, 1-nerved, the second exceeding the first and less than half the length of the obscurely nerved and obtuse flowering scales, which are ½″–1″ long.

On salt meadows, sea beaches and in waste places, Nova Scotia to New Jersey. Probably naturalized from Europe. July–Aug.

3. Puccinellia airoides (Nutt.) Wats. & Coult. Slender Meadow-grass. (Fig. 495.)

Poa airoides Nutt. Gen. 1: 68. 1818.
Panicularia distans airoides Scribn. Mem. Torr. Club, 5: 54. 1894.
Puccinellia airoides Wats. & Coult. in A. Gray, Man. Ed. 6, 668. 1890.

Culms 1°–4° tall, erect, simple, smooth and glabrous. Sheaths usually longer than the internodes; ligule 1″ long; leaves 2′–6′ long, 1½″ wide or less, flat or involute, usually erect, smooth beneath, rough above; panicle open, its branches slender, spreading or ascending, rarely erect, the lower 2′–3½′ long and often reflexed; spikelets scattered, 1–7-flowered, 1½″–3″ long; empty scales unequal, the first acute, 1-nerved, the second obtuse or acute, 3-nerved, more than half the length of the obtuse flowering scales, which are 1″–1¼″ long.

In saline soil, Manitoba to the Northwest Territory, Washington, Colorado and Nevada. July–Aug.

4. Puccinellia angustàta (R. Br.) Nash. Arctic Meadow-grass. (Fig. 496.)

Poa angustata R. Br. App. Parry's Voy. 287. 1824.
Panicularia angustata Scribn. Mem. Torr. Club, 5: 54. 1894.
Puccinellia maritima var. *minor* S. Wats. in A. Gray, Man. Ed. 6, 668. 1890.
Puccinellia angustata Nash, Bull. Torr. Club, 22: 512. 1895.

Smooth and glabrous, culms 4′–12′ tall, erect, simple. Sheaths usually overlapping; ligule 1″ long; leaves ½′–2½′ long, 1″ wide or less; panicle 1′–2′ in length, contracted, the branches short and erect or appressed; spikelets 2–7-flowered, 3″–4″ long; empty scales obtuse or rounded at the apex, the first 1-nerved, the second 3-nerved; flowering scales 1¼″–1½″ long, usually purplish, rounded at the apex.

Greenland and Hudson Bay to Alaska, south to Maine. Also in Europe and Asia. Summer.

83. FESTÙCA L. Sp. Pl. 73. 1753.

Mostly tufted perennial grasses, with flat or convolute leaves and paniculate inflorescence. Spikelets 2–several-flowered. Two lower scales empty, more or less unequal, acute, keeled; flowering scales membranous, narrow, rounded on the back, 5-nerved, usually acute, and generally awned at the apex. Palet scarcely shorter than the scale. Stamens 1–3. Styles very short, distinct. Stigmas plumose. Grain glabrous, elongated, often adherent to the scale or palet. [Latin, stalk or straw.]

A genus of about 80 species, widely distributed, particularly numerous in temperate regions. Besides the following, some 15 others occur in the western parts of North America.

Leaves 1″ wide or less.
- Annuals; flowering scales awned.
  - First scale more than half as long as the second; awn short. — 1. *F. octoflora.*
  - First scale less than half as long as the second; awn long. — 2. *F. Myuros.*
- Perennials; flowering scales short-awned or bristle-pointed.
  - Basal leaves filiform or setaceous, ¼″ wide.
    - Culms from a rootstock or with stolons. — 3. *F. rubra.*
    - Culms densely tufted, no rootstocks. — 4. *F. ovina.*
  - Basal leaves flat, about 1″ wide, becoming involute in drying. — 5. *F. scabrella.*

Leaves 2″ wide or more, flat.
- Flowering scales unawned or short-awned.
  - Flowering scales 2½″–3½″ long; spikelets 5–10-flowered. — 6. *F. elatior.*
  - Flowering scales 2″ long or less; spikelets 3–6-flowered.
    - Spikelets very broad; branches of the panicle spikelet-bearing from the middle or below; flowering scales obtuse. — 7. *F. Shortii.*
    - Spikelets lanceolate; branches elongated; spikelets at ends; scales acute. — 8. *F. nutans.*
- Flowering scales long-awned. — 9. *F. gigantea.*

1. Festuca octoflòra Walt. Slender Fescue-grass. (Fig. 497.)

Festuca octoflora Walt. Fl. Car. 81. 1788.
Festuca tenella Willd. Enum. 1: 113. 1809.

Culms 4′–18′ tall, erect, from an annual root, slender, rigid, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 1½′–3′ long, involute, bristle-form; raceme or simple panicle often one-sided, 1′–6′ in length, contracted, its branches erect, or rarely ascending; spikelets 6–13-flowered, 3″–5″ long; empty scales acute, smooth, the first 1-nerved, more than half the length of the 3-nerved second one; flowering scales, exclusive of awns, 1½″–2½″ long, usually very scabrous, acuminate into an awn nearly as long as the body or shorter, or sometimes awnless; stamens 2.

Dry sandy soil, Quebec to British Columbia, south to Florida, Texas and California. Leaves sometimes pubescent. June–Aug.

2. Festuca Myùros L. Rat's-tail Fescue-grass. (Fig. 498.)

Festuca Myuros L. Sp. Pl. 74. 1753.

Smooth, glabrous, culms 1°–2° tall, erect from an annual root, slender, simple. Sheaths often shorter than the internodes, the upper sometimes enclosing the base of the panicle; ligule ½″ long, truncate; leaves 2′–5′ long, subulate, involute, erect; panicle usually one-sided, 4′–12′ in length, contracted, sometimes curved, its branches appressed; spikelets 3–6-flowered; empty scales very unequal, acute, smooth, the first 1-nerved, less than half as long as the 3-nerved second one; flowering scales, exclusive of the awns, 2″–3″ long, narrow, scabrous, acuminate into an awn much longer than the body; stamen 1.

In waste places and fields, eastern Massachusetts to New Jersey and Florida. Also on the Pacific coast. Naturalized from Europe. June–July.

3. Festuca rùbra L. Red Fescue-grass. (Fig. 499.)

Festuca rubra L. Sp. Pl. 74. 1753.

Culms 1½°–2½° tall, from running rootstocks, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short, truncate; basal leaves involute-filiform, 3′–6′ long; culm leaves shorter, erect, flat or involute in drying, minutely pubescent above; panicle 2′–5′ in length, sometimes red, open at flowering time, contracted in fruit; spikelets 3–10-flowered, 4″–6″ long; lower scales acute, unequal, the first 1-nerved, shorter than the 3-nerved second; flowering scales about 3″ long, obscurely 5-nerved, sometimes scabrous, bearing awns of less than their own length.

Labrador to Alaska, south, especially on the mountains, to Tennessee and Colorado. Also in Europe and Asia. Summer.

4. Festuca ovìna L. Sheep's Fescue-grass. (Fig. 500.)

Festuca ovina L. Sp. Pl. 73. 1753.

Smooth, glabrous, culms 6′–14′ tall, erect, tufted, slender, rigid, simple; no rootstocks. Sheaths usually crowded at the base of the culm; ligule auriculate, short; leaves filiform or setaceous, those of the culm few, 1′–3′ long, erect, the basal ones numerous; panicle 1½′–3′ long, often one-sided, narrow, its branches short, usually erect or appressed; spikelets 3–5-flowered; empty scales unequal, acute, the first 1-nerved, the second 3-nerved; flowering scales 1½″–2″ long, smooth, acute, usually short-awned.

In fields and waste places, Labrador to British Columbia, south to New Jersey, Colorado and California. Variable. Probably indigenous northward, but mostly naturalized from Europe. Native also of Asia. The subarctic and Rocky Mountain var. *brevifolia* S. Watson, may be a distinct species. June-July.

The so-called var. *vivipara*, a state of this grass with the scales wholly or partly transformed into small leaves, is found on the mountains of New England and in arctic America.

Festuca ovina duriúscula (L.) Hack. Monog. Fest. Europ. 89. 1882.

Festuca duriuscula L. Sp. Pl. 74. 1753.

Culms taller and stouter, the panicle usually more open and the flowering scales about 3″ long. Newfoundland to the Rocky Mountains, south to Virginia and Colorado. Naturalized from Europe.

5. Festuca scabrélla Torr. Rough Fescue-grass. (Fig. 501.)

Festuca scabrella Torr.; Hook. Fl. Bor. Am. 2: 252. *pl. 233.* 1840.

Culms 1°–3° tall, erect, simple, usually rough, below the panicle. Sheaths overlapping, smooth; ligule a ring of very short hairs; leaves rough, 1″ wide or less, those of the culm 1′–3′ long, erect, the basal flat, much longer and readily deciduous from the sheaths, involute in drying; panicle 3′–4′ in length, open, its branches ascending or the lower widely spreading; spikelets 3–5-flowered, about 4″ long; empty scales scarious, unequal, smooth, the first 1-nerved, the second longer, 3-nerved; flowering scales about 3″ long, scabrous, often bearing a short awn 1″ long or less.

Labrador and Quebec to Manitoba and British Columbia, south to California. Summer.

6. Festuca elàtior L. Tall or Meadow Fescue-grass. (Fig. 502.)

Festuca elatior L. Sp. Pl. 75. 1753.
Festuca pratensis Huds. Fl. Angl. 37. 1762.
Festuca elatior var. *pratensis* A. Gray, Man. Ed. 5, 634. 1867.

Culms 2°–5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule very short; leaves 4′–15′ long, 2″–4″ wide, flat, smooth beneath, more or less rough above; panicle 4′–14′ in length, often nodding at the top, simple to very compound, the branches ascending or erect, 2′–8′ long; spikelets 5–9-flowered, 4½″–6″ long; empty scales acute, the first 1–3-nerved, the second 3–5-nerved; flowering scales acute or short-pointed, smooth and glabrous, 2½″–3″ long, indistinctly 5-nerved.

In fields and waste places, Nova Scotia to Ontario, south to North Carolina, Tennessee and Kansas. Naturalized from Europe and cultivated for hay. Variable. July–Aug.

7. Festuca Shórtii Kunth. Short's Fescue-grass. (Fig. 503.)

Festuca Shortii Kunth; Wood, Class-book, 794. 1861.

Festuca nutans var. *palustris* Wood, Bot. & Fl. 399. 1873.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths much shorter than the internodes; ligule very short; leaves 5′–10′ long, 1″–3″ wide, flat, smooth beneath, rough above; panicle 3′–7′ in length, open, the branches spreading or ascending, rarely erect, spikelet-bearing from the middle or below, the lower 1½′–3½′ long; spikelets broadly obovate, when mature, 3–6 flowered, 2½″–3″ long; empty scales acute, unequal, scabrous on the nerves, the first 1–3-nerved, the second 3-nerved; flowering scales about 2″ long, smooth, obtuse or acutish, faintly nerved.

In woods and thickets, Pennsylvania (according to Porter) and Illinois to Kansas, south to Mississippi and Texas. July–Aug.

8. Festuca nùtans Willd. Nodding Fescue-grass. (Fig. 504.)

Festuca nutans Willd. Enum. 1: 116. 1809.

Culms 2°–3° tall, erect, simple, slender, glabrous or sometimes pubescent. Sheaths much shorter than the internodes, glabrous or pubescent; ligule very short; nodes black; leaves 4′–12′ long, 2″–3″ wide, rather dark green, flat, smooth beneath, rough above; panicle 4′–9′ in length, its branches at first erect, the lower 2½′–5′ long, finally spreading and nodding, spikelet-bearing only at the ends; spikelets lanceolate, 3–5-flowered, 2½″–3″ long; empty scales acute, scabrous on the keel, the the first 1-nerved, shorter than the 3-nerved second; flowering scales about 2″ long, smooth, acute, very faintly nerved.

In rocky woods, Nova Scotia to Ontario and Nebraska, south to Florida and Texas. Ascends to 2300 ft. in Virginia. June–Aug.

9. Festuca gigantèa (L.) Vill. Great Fescue-grass. (Fig. 505.)

Bromus giganteus L. Sp. Pl. 77. 1753.
Festuca gigantea Vill. Hist. Pl. Dauph. 2: 110. 1787.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths usually overlapping; ligule 1″ long; leaves 5′–1° long or more, bright green, 2″–6″ wide, flat, rough; panicle 7′–12′ in length, loose, narrow, the branches erect or ascending, the lower 2′–4′ long; spikelets 3–7-flowered; empty scales acuminate, smooth and glabrous, the first 1–3-nerved, shorter than the 3–5-nerved second; flowering scales, exclusive of awns, about 3″ long, faintly 5-nerved, slightly scabrous, minutely 2-toothed at the apex, bearing an awn 6″–8″ long.

In waste places, Maine to southern New York. Adventive from Europe. July–Aug.

84. BRÒMUS L. Sp. Pl. 76. 1753.

Annual or perennial grasses, with flat leaves and terminal panicles, the pedicels thickened at the summit. Sheaths sometimes not split. Spikelets few–many-flowered. Two lower scales empty, unequal, acute; flowering scales rounded on the back, or sometimes compressed-keeled, 5–9-nerved, the apex usually 2-toothed, generally bearing an awn just below the summit; palet shorter than the scale, 2-keeled. Stamens usually 3. Stigmas sessile, plumose, inserted below a hairy cushion-like appendage at the top of the ovary. Grain adherent to the palet. [Greek name for a kind of oats.]

About 40 species, most numerous in the north temperate zone. Besides the following, some 14 others occur in the western parts of North America.

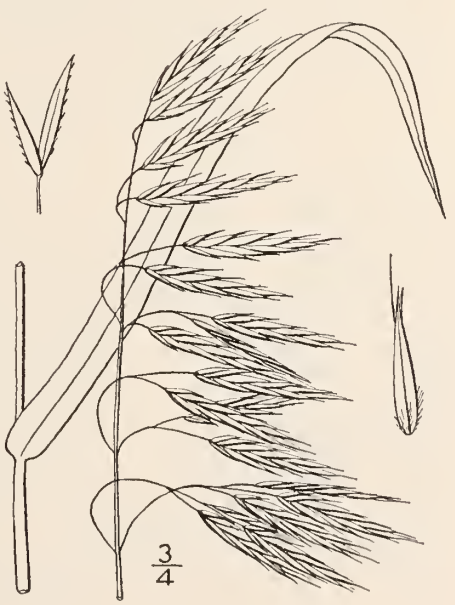
Lower empty scale 1-nerved, the upper 3-nerved.
- Tall perennials, 2°–4° high.
  - Sheaths glabrous or softly pubescent, the lower sometimes sparingly hirsute.
    - Leaves 2″–6″ wide; culms stoutish; branches of the panicle more or less spreading or drooping. 1. *B. ciliatus.*
    - Leaves less than 2″ wide; culms slender; branches of the panicle erect. 2. *B. erectus.*
  - Sheaths strongly retrorse-hirsute. 3. *B. asper.*
- Low annuals, 1°–2° high; spikelets drooping.
  - Spikelets numerous, on slender recurved unilateral pedicels; flowering scales 4″–6″ long. 4. *B. tectorum.*
  - Spikelets few, the pedicels not unilateral; flowering scales 6″–8″ long. 5. *B. sterilis.*

Lower empty scale 3-nerved, the upper 5–9-nerved (3-nerved in No. 6).
- Flowering scales rounded on the back, at least below.
  - Flowering scales awned.
    - Flowering scales pubescent.
      - Pubescence dense, consisting of long silky hairs.
        - Second empty scale 3-nerved; flowering scales 5″–6″ long. 6. *B. Porteri.*
        - Second empty scale 5–7-nerved; flowering scales about 4″ long. 7. *B. Kalmii.*
      - Pubescence of short appressed soft hairs, not dense. 8. *B. hordeaceus.*
    - Flowering scales glabrous or minutely roughened.
      - Awns straight.
        - Nerves of the turgid flowering scales obscure; palet about equalling the scale, which is 3″–4″ long. 9. *B. secalinus.*
        - Nerves of the flowering scale prominent; palet considerably shorter than the scale, which is 4″–5″ long. 10. *B. racemosus.*
      - Awns strongly bent near the base, divergent. 11. *B. squarrosus.*
  - Flowering scales not awned, nearly as broad as long. 12. *B. brizaeformis.*
- Flowering scales compressed-keeled.
  - Flowering scales pubescent; awn 2″–3″ long. 13. *B. breviaristatus.*
  - Flowering scales minutely roughened; awn less than 1″ long, or none. 14. *B. unioloides.*

1. Bromus ciliàtus L. Fringed Brome-grass. Wood Chess. (Fig. 506.)

Bromus purgans L. Sp. Pl. 76. 1753?
Bromus ciliatus L. Sp. Pl. 76. 1753.

Culms 2°–4° tall, erect, simple, glabrous or pubescent. Sheaths often shorter than the internodes, smooth or rough, often softly pubescent, or the lower sometimes sparingly hirsute; ligule very short; leaves 4′–12′ long, 2″–6″ wide, smooth beneath, scabrous and often pubescent above; panicle open, 4′–10′ in length, its branches lax, widely spreading or often drooping; spikelets 5–10-flowered, 1′ long or less; empty scales very acute, glabrous, rough on the keel, the first 1-nerved, the second longer, 3-nerved; flowering scales 4″–6″ long, obtuse or acute, 5–7-nerved, appressed-pubescent on the margins or over the entire surface; awn 2″–4″ long.



In woods and thickets, Newfoundland to Manitoba and British Columbia, south to Florida and Texas. Variable. The form known as var. *purgans* (*B. pubescens* Muhl.) with the flowering scales pubescent all over, may be distinct. July–Aug.

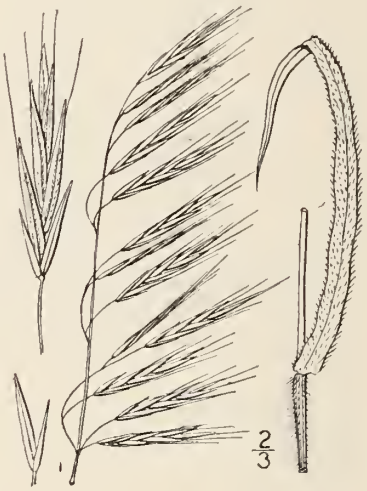
2. Bromus eréctus Huds. Upright Brome-grass. (Fig. 507.)

Bromus erectus Huds. Fl. Angl. 39. 1762.

Culms 2°–3° tall, erect, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth and glabrous, or slightly pubescent; ligule ½″ long, erose-truncate; leaves sparingly pubescent, 1″–2″ wide, those of the culm 4′–8′ long, the basal about 1° long, very narrow; panicle 3′–7′ in length, the branches erect or ascending, the lower 1′–3′ long; spikelets ½′–1½′ long, sometimes purplish, 5–10-flowered; empty scales acuminate, the first 1-nerved, the second longer, 3-nerved; flowering scales 5″–6″ long, acuminate, very rough-pubescent, 5-nerved, the intermediate nerves faint; awn 2″–3″ long.

In waste places about New York. Adventive from Europe. July–Aug.

3. Bromus ásper Murr. Hairy Brome-grass. (Fig. 508.)



Bromus asper Murr. Prodr. Stirp. Goett. 42. 1770.

Culms 2°–6° tall, erect, simple, rough. Sheaths shorter than the internodes, strongly retrorse-hirsute, especially the lower; ligule 1½″ long; leaves 8′–1° long or more, 3″–6″ wide, rough or often hirsute; panicle 6′–12′ in length, open, the branches usually drooping; spikelets 5–10-flowered 1′–1½′ long; empty scales acute, scabrous on the nerves, the first 1-nerved, the second longer, 3-nerved; flowering scales about 6″ long, acute, hispid near the margins and on the lower part of the keel; awn 3″–4″ long.

In waste places, New Brunswick to Michigan and Kentucky. Naturalized from Europe. July–Aug.

4. Bromus tectòrum L. Downy Brome-grass. (Fig. 509.)

Bromus tectorum L. Sp. Pl. 77. 1753.

Culms 6′–2° tall, erect from an annual root, simple, smooth and glabrous. Sheaths usually longer than the internodes, at least the lower ones softly pubescent; ligule 1″–2″ long; leaves 1′–4′ long, 1″–2″ wide, softly pubescent; panicle 2′–6′ in length, open, the branches slender and drooping, somewhat one-sided; spikelets numerous, 5–8-flowered, on capillary recurved slender pedicels; empty scales acuminate, usually rough or hirsute, the first 1-nerved, the second longer, 3-nerved; flowering scales 4″–6″ long, acuminate, 7-nerved, usually rough or hirsute; awn 6″–8″ long,

In fields and waste places, Rhode Island to Ontario, south to Maryland and Ohio. Naturalized from Europe. Sometimes a troublesome weed. May–July.

5. Bromus stérilis L. Barren Brome-grass. (Fig. 510.)

Bromus sterilis L. Sp. Pl. 77. 1753.

Culms 1°–2° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth or rough, the lower sometimes pubescent; ligule 1″ long; leaves 3′–9′ long, 1″–3″ wide, usually more or less pubescent; panicle 5′–10′ in length, the branches ascending or often widely spreading, not one-sided, stiff; spikelets few, 5–10-flowered, spreading or pendulous; empty scales acuminate, glabrous, the first 1-nerved, the second longer, 3-nerved; flowering scales 6″–8″ long, acuminate, 7-nerved, scabrous on the nerves, the awn 7″–12″ long.

In waste places and ballast, eastern Massachusetts to Pennsylvania and Ohio. Locally naturalized or adventive from Europe. Native also of Asia. June–July.

6. Bromus Pòrteri (Coulter) Nash. Porter's Chess. (Fig. 511.)

Bromus Kalmii var. *Porteri* Coulter, Man. Bot. Rocky Mt. Region, 425. 1885.
Bromus Porteri Nash, Bull. Torr. Club, 22: 512. 1895.

Culms 1½°–3° tall, erect, simple, pubescent below the nodes. Sheaths shorter than the internodes, glabrous or sometimes softly pubescent; ligule ½″ long, truncate; leaves 1″–3″ wide, rough, those of the culm 4′–9′ long, the basal narrow and about one-half of the length of the culm; panicle 3′–6′ in length, its branches drooping and flexuous, at least when old, the nodes of the axis pubescent; spikelets 5–10-flowered, 9″–15″ long, on slender flexuous pedicels; empty scales pubescent, the first narrower than the second, both 3-nerved; flowering scales 5″–6″ long, obtuse, 5–7-nerved, densely pubescent with long silky hairs; awn 1″–2″ long.

In dry soil, South Dakota to Montana, south to western Nebraska, New Mexico and Arizona. July–Aug.

7. Bromus Kàlmii A. Gray. Kalm's Chess. (Fig. 512.)

Bromus purgans L. Sp. Pl. 76. 1753?
Bromus Kalmii A. Gray, Man. 600. 1848.

Culms 1½°–3° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, more or less pubescent; ligule very short; leaves 2½′–7′ long, 1″–4″ wide, sparingly pubescent; panicle 2′–6′ in length, open, its branches usually flexuous; spikelets 6–10-flowered, 6″–12″ long, on slender flexuous pedicels; empty scales pubescent, the first narrow, acute, 3-nerved, the second longer, broad, obtuse or mucronate, 5–7-nerved; flowering scales about 4″ long, 7–9-nerved, densely silky pubescent, the awn 1″–1½″ in length.

In woods and thickets, Quebec to Manitoba, south to Massachusetts, Pennsylvania, Illinois and Iowa. July–Aug.

8. Bromus hordeàceus L. Soft Chess. (Fig. 513.)

Bromus hordeaceus L. Sp. Pl. 77. 1753.

Bromus mollis L. Sp. Pl. Ed. 2, 112. 1762.

Culms 8′–3° tall, erect, often slender, usually pubescent below the panicle. Sheaths shorter than the internodes, mostly pubescent; ligule ½″ long; leaves 1′–7′ long, 1″–3″ wide, pubescent; panicle generally contracted, its branches erect or ascending, 1′–2′ long; spikelets appressed-pubescent, on short pedicels; empty scales acute, the first 3-nerved, the second longer, 5–7-nerved; flowering scales broad, obtuse, 3½″–4½″ long, 7–9-nerved, bearing an awn 3″–4″ in length between the obtuse or acute teeth.

In fields and waste places, New York to Virginia. Locally adventive from Europe. July–Aug.

9. Bromus secálinus L. Cheat. Chess. (Fig. 514.)

Bromus secalinus L. Sp. Pl. 76. 1753.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, generally glabrous; ligule ½″ long, erose; leaves 2′–9′ long, 1″–3″ wide, smooth or rough, sometimes hairy; panicle 2′–8′ in length, open, its branches ascending or drooping; spikelets turgid, glabrous, erect or somewhat pendulous, 6–10-flowered; empty scales scabrous toward the apex, the first 3-nerved, acute, the second longer and broader, 7-nerved, obtuse; flowering scales 3″–4″ long, broad, turgid, obtuse, rough toward the apex, the nerves obscure awnless, or bearing a straight awn 4″ long or less between the obtuse short teeth; palet about equalling the scale.

In fields and waste places almost throughout temperate North America, often a pernicious weed in grain fields. Naturalized from Europe. Native also of Asia. June–Aug.

10. Bromus racemòsus L. Upright Chess. Smooth Brome-grass. (Fig. 515.)

Bromus racemosus L., Sp. Pl. Ed. 2, 114. 1762.

Culms 1°–3° tall, erect, simple, smooth and glabrous, or sparingly pubescent below the panicle. Sheaths shorter than the internodes, glabrous or pubescent; ligule 1″ long; leaves 1′–9′ long, ½″–4″ wide, pubescent; panicle 1′–10′ in length, the branches erect or ascending, the lower sometimes 2½′ long; spikelets erect, 5–11-flowered; empty scales acute, the first 3-nerved, the second longer and broader, 5–9-nerved; flowering scales broad, 3½″–4½″ long, obtuse, smooth and shining, the nerves prominent; awn straight, 3″–4″ in length; palet considerably shorter than the scale.

In fields and waste places all over the eastern United States and British America; also on the Pacific Coast. Naturalized from Europe. Native also of Asia. June–Aug.

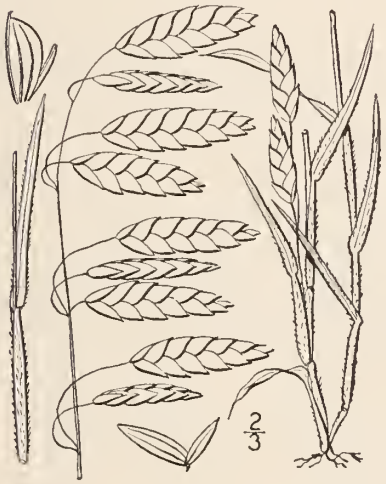
11. Bromus squarròsus L. Corn Brome. (Fig. 516.)

Bromus squarrosus L. Sp. Pl. 76. 1753.

Culms 8′–18′ tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, softly pubescent; ligule ½″ long; leaves 1′–5′ long, 1″–2″ wide, softly pubescent; panicle 2′–6′ in length, open, the branches ascending or drooping, often flexuous; spikelets nodding, 6–12-flowered, on slender pedicels; empty scales obtuse or acutish, the first 5-nerved, the second longer, 7–9-nerved; flowering scales 4½″–5½″ long, obtuse, shining, minutely scabrous; awn inserted below the apex, about as long as the scale, bent at the base and divergent.

In ballast and waste places about the eastern seaports. Fugitive or adventive from Europe. July–Aug.

12. Bromus brizaefórmis Fisch. & Mey. Quakegrass Brome. (Fig. 517.)



Bromus brizaeformis Fisch. & Mey. Ind. Sem. Hort. Petrop. 3: 30. 1836.

Culms 8′–2° tall, erect, simple, often slender, smooth and glabrous. Sheaths shorter than the internodes, the lower pubescent with soft villous hairs; ligule 1″ long, erose-truncate; leaves 1′–7′ long, 1″–3″ wide, pubescent; panicle 1½′–8′ in length, open, the branches ascending or often drooping, flexuous; spikelets few, ½′–1′ long, laterally much compressed; empty scales very obtuse, often purplish, glabrous or minutely pubescent, the first 3–5-nerved, the second larger, 5–9-nerved; flowering scales 3″–4″ long, very broad, obtuse, 9-nerved, shining, glabrous or sometimes minutely pubescent, unawned.

Sparingly introduced into Pennsylvania; also from Montana to California. Native of northern Europe and Asia. July–Aug.

13. Bromus breviaristàtus (Hook.) Buckl. Short-awned Chess. (Fig. 518.)

Ceratochloa breviaristata Hook. Fl. Bor. Am. 2: 253. 1840.

Bromus breviaristatus Buckl. Proc. Acad. Phila. 1862: 98. 1862.

Culms 1°–4° tall, erect, simple, smooth or rough, sometimes pubescent below the panicle. Sheaths pubescent, at least the lower ones, which are often overlapping; ligule 1″ long, truncate; leaves 6′–1° long or more, 2″–6″ wide, rough and often pubescent; panicle 4′–15′ in length, its branches erect or ascending, the lower 2′–6′ long; spikelets 5–10-flowered; empty scales acute, pubescent, the first 3–5-nerved, the second longer, 5–9-nerved; flowering scales compressed, keeled, 6″–7″ long, acute, 7–9-nerved, appressed-pubescent; awn 2″–3″ long.

In dry soil, Manitoba to British Columbia, south to Nebraska, Arizona and California. July–Aug.

14. Bromus unioloides (Willd.) H.B.K. Schrader's Brome-grass. Southern Chess. (Fig. 519.)

Festuca unioloides Willd. Hort. Berol. 1: 3. *pl. 3.* 1806.

Bromus unioloides H.B.K. Nov. Gen. 1: 151. 1815.

Bromus Schraderi Kunth, Enum. 1: 416. 1833.

Culms 6′–3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, the lower often overlapping, smooth or rough, and glabrous or frequently pubescent; ligule 1″–2″ long; leaves 3′–13′ long, 1″–4″ wide, usually rough, at least above; panicle 2′–10′ in length, the branches erect or ascending, or the lower branches of the larger panicles widely spreading; spikelets much compressed, 6–10-flowered; empty scales acute, the first 3–5-nerved, the second longer, 5–9-nerved; flowering scales 6″–8″ long, very acute, minutely scabrous, bearing an awn less than 1″ long or awnless.

Kansas (?) to the Indian Territory, Texas and Mexico. Widely distributed in South America. May–July.

85. NÀRDUS L. Sp. Pl. 53. 1753.

A low perennial tufted grass, with setaceous rigid leaves and a terminal one-sided slender spike. Spikelets 1-flowered, narrow, sessile and single in each notch of the rachis. Scales 2, the lower empty, adnate to the rachis, or almost wanting, the upper flower-bearing, narrow, with involute and hyaline margins; palet narrow, 2-nerved. Stamens 3. Style elongated, undivided. Stigma elongated, short-papillose. Grain linear, glabrous, enclosed in the scale, usually free. [Name Greek, of uncertain application.]

A monotypic genus of the Old World.

1. Nardus stricta L. Wirebent. Mat-grass. Nard. (Fig. 520.)

Nardus stricta L. Sp. Pl. 53. 1753.

Culms 5′–15′ tall, erect, simple, rigid, roughish. Sheaths usually at the base of the culm; ligule ½″ long, rounded; leaves setaceous, stiff, rough, the 1 or 2 culm leaves about 1′ long, erect, the basal ones numerous, 2′–5′ long; spike 1′–3′ in length, strict; spikelets 1-flowered, 3″–4″ long, arranged alternately in 2 rows on one side of the erect slender rachis, often purplish; lower scale empty, very short, adnate to the rachis, sometimes almost wanting; flowering scale 3″–4″ long, scabrous, long-acuminate or short-awned.

Introduced into Newfoundland and at Amherst, Mass. Adventive from Europe. July–Aug.

86. LÒLIUM L. Sp. Pl. 83. 1753.

Annual or perennial grasses, with flat leaves and terminal spikes. Spikelets several-flowered, solitary, sessile and alternate in the notches of the usually continuous rachis, compressed, the edge of the spikelet (backs of the scales) turned toward the rachis. Scales rigid; lower scale empty in the lateral spikelets, and the 2 lower empty in the terminal; flowering scales rounded on the back, 5–7-nerved; palets 2-keeled. Stamens 3. Styles distinct, very short. Stigmas 2, plumose. Grain adherent to the palet. [Latin name for Darnel.]

About 6 species, natives of the Old World.

Empty scale shorter than the spikelet. 1. *L. perenne.*
Empty scale equalling or extending beyond the flowering scales. 2. *L. temulentum.*

1. Lolium perénne L. Ray-grass. Rye-grass. (Fig. 521.)

Lolium perenne L. Sp. Pl. 83. 1753.

Smooth and glabrous, culms 6′–2½° tall, erect, simple. Sheaths shorter than the internodes; ligule very short; leaves 2′–5′ long, 1″–2″ wide; spike 3′–8′ in length; spikelets 5-10-flowered, 4″–6″ long, the empty scale shorter than the spikelet, strongly nerved; flowering scales 2″–3″ long, obscurely nerved, acuminate or awned, the awn sometimes nearly as long as the body of the scale.

In waste places and cultivated grounds almost throughout the northern United States and southern British America. Naturalized from Europe. Native also of Asia. Erroneously called Darnel, this name belonging to the following species. July–Aug.

2. Lolium temuléntum L. Darnel. Ivray. (Fig. 522.)

Lolium temulentum L. Sp. Pl. 83. 1753.

Glabrous, culms 2°–4° tall, erect, simple, smooth. Sheaths overlapping; ligule 1″ long or less; leaves 4′–10′ in length, 1″–3″ wide, smooth beneath, rough above; spike 4′–12′ in length; spikelets 4–8-flowered, 5″–9″ long, the strongly nerved empty scale equalling or extending beyond the obscurely nerved flowering scales, which are awned or awnless.

In waste places and cultivated grounds, locally naturalized or adventive from Europe, New Brunswick to Michigan and Georgia. Abundant on the Pacific Coast. Locally a troublesome weed. June–Aug.

87. LEPTÙRUS R. Br. Prodr. Fl. Nov. Holl. 1: 207. 1810.

Usually low annual grasses, with narrow leaves and strict or curved elongated slender spikes. Spikelets 1–2-flowered, sessile and single in alternate notches of the jointed rachis. Empty scales 2, rarely 1, narrow, rigid, acute, 5-nerved; flowering scales much shorter, hyaline, keeled, one side turned to the rachis. Palets hyaline, 2-nerved. Stamens 3, or fewer. Styles short, distinct. Stigmas 2, plumose. Grain narrow, glabrous, free, enclosed in the scale. [Greek, referring to the narrow spikes.]

Species 5 or 6, natives of the Old World.

1. Lepturus filifórmis (Roth) Trin. Slender Hardgrass. (Fig. 523.)

Rottboellia filiformis Roth, Catal. 1: 21. 1797.

Lepturus filiformis Trin. Fund. Agrost. 123. 1820.

Culms 3′–12′ long, decumbent, much branched, smooth and glabrous. Sheaths loose, shorter than the internodes; ligule ½″ long, auriculate; leaves ½′–2′ long, 1″ wide or less, usually involute, smooth beneath, rough above; spikes 1′–6′ in length, slender, strict or curved; spikelets 2″–2½″ long; empty scales acute; flowering scales about 1¾″ long, 1-nerved.

In waste places, southern Pennsylvania to Virginia, near or along the coast. Adventive from Europe. Summer.

88. AGROPYRON J. Gaertn. Nov. Comm. Petrop. 14: Part 1, 539. 1770.

Annual or perennial grasses, with flat or involute leaves and terminal spikes. Spikelets 3-many-flowered, sessile, single and alternate at each notch of the usually continuous rachis, the side of the spikelet turned toward the rachis. Two lower scales empty; flowering scales rigid, rounded on the back, 5–7-nerved, usually acute or awned at the apex; palets 2-keeled, the keels often ciliate. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain pubescent at the apex, usually adherent to the palet. [Greek, referring to the growth of these grasses in wheat fields.]

About 32 species, in all temperate regions. Besides the following, some 5 others occur in the western parts of North America.

Plants with running rootstocks.	
Flowering scales glabrous.	1. *A. repens.*
Flowering scales villous.	2. *A. dasystachyum.*
Plants without running rootstocks.	
Flowering scale terminating in an awn shorter than its body.	
Spikes short and broad; empty scales broad, 5–7-nerved.	3. *A. violaceum.*
Spikes long and slender; empty scales narrow, 3–5-nerved.	4. *A. tenerum.*
Flowering scale terminating in an awn longer than its body.	5. *A. caninum.*

1. Agropyron rèpens (L.) Beauv. Couch-grass. Quitch-grass. (Fig. 524.)

Triticum repens L. Sp. Pl. 86. 1753.
Agropyron repens Beauv. Agrost. 146. 1812.

Culms 1°–4° tall, from a long jointed running rootstock. Sheaths usually shorter than the internodes, smooth and glabrous; ligule very short; leaves 3′–12′ long, 1″–5″ wide, smooth beneath, rough above; spike 2′–8′ in length, strict; spikelets 3–7-flowered; empty scales strongly 5–7-nerved, usually acute or awn-pointed, sometimes obtuse; flowering scales smooth and glabrous, acute or short-awned at the apex.

In fields and waste places, almost throughout North America except the extreme north. Naturalized from Europe and often a troublesome weed. Very variable. Native also of Asia. July–Sept.

Agropyron rèpens glaùcum (Desf.) Scribn. Mem. Torr. Club, 5: 57. 1894.

Triticum glaucum Desf. Tabl. Bot. Mus. 16. 1804.
Agropyrum glaucum R. & S. Syst. 2: 752. 1817.

Larger and stouter, pale green or glaucous; spikelets 5–15-flowered, the empty scales long-acuminate. Minnesota and Manitoba to Alaska, south to Missouri, Texas and Arizona. Reported from New England. Probably a distinct species.

2. Agropyron dasystàchyum (Hook.) Vasey. Northern Wheat-grass. (Fig. 525.)

Triticum repens var. *dasystachyum* Hook. Fl. Bor. Am. 2: 254. 1840.

Agropyrum dasystachyum Vasey, Spec. Rept. U. S. Dept. Agric. 63: 45. 1883.

Glaucous, culms 1°–3° tall, erect, from long running rootstocks, simple, smooth and glabrous; sheaths shorter than the internodes; ligule very short; leaves 2′–9′ long, 1″–3″ wide, flat, or becoming involute in drying, smooth beneath, rough above; spike 2½′–7′ in length; spikelets 4–8-flowered; empty scales 3–5-nerved, lanceolate, acuminate or short-awned, 3″–4½″ long; flowering scales broadly lanceolate, 5-nerved, 4½″–6″ long, acute or short-awned, densely villous.

Hudson Bay to the Northwest Territory and Wyoming and to the shores of Lakes Huron and Superior. Summer.

3. Agropyron violàceum (Hornem.) Vasey. Purplish Wheat-grass. (Fig. 526.)

Triticum violaceum Hornem. Fl. Dan. *pl. 2044.* 1832.
Agropyrum violaceum Vasey, Spec. Rept. U. S. Dept. Agric. 63: 45. 1883.

Culms 6′–2° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 2′–6′ long, 1″–3″ wide, flat or involute, rough or sometimes smooth beneath; spike 1′–4′ in length, occasionally longer, 2″–3″ broad; spikelets 3–6-flowered; empty scales broad, usually purplish, scarious on the margins, 5–7-nerved, 4″–6″ long, acute or acuminate, sometimes awn-pointed, rarely long-awned; flowering scales often purplish, 5–7-nerved, scarious on the margins, 4″–6″ long, acuminate or short-awned, the awn rarely as long as the body.

Quebec to western Ontario and British Columbia, south to the mountains of New England, New York and Pennsylvania, and in the Rocky Mountains to Colorado. Ascends to 5500 ft. in the White Mountains. Also in northern Europe and Asia. Summer.

4. Agropyron ténerum Vasey. Slender Wheat-grass. (Fig. 527.)

Agropyrum tenerum Vasey, Coult. Bot. Gaz. 10: 258. 1885.

Glabrous, culms 2°–3° tall, erect, simple, often slender, smooth. Sheaths usually shorter than the internodes, glabrous; ligule very short; leaves 3′–10′ long, 1″–2″ wide, flat or involute, rough; spike 3′–7′ in length, usually narrow and slender; spikelets 3–5-flowered; empty scales 4″–6″ long, acuminate or short-awned, 3–5-nerved, scarious on the margins; flowering scales 5″–6″ long, 5-nerved, awn-pointed or short-awned, scarious on the margins, often rough toward the apex.

In dry soil, Manitoba and Minnesota to British Columbia, south to Nebraska, Colorado and California. Reported from the Northeast Territory. July-Aug.

5. Agropyron canìnum (L.) R. & S. Awned Wheat-grass. Fibrous-rooted Wheat-grass. (Fig. 528.)

Triticum caninum L. Sp. Pl. 86. 1753.

Agropyrum caninum R. & S. Syst. 2: 756. 1817.

Agropyrum unilaterale Cassidy, Bull. Colo. Agric. Exp. Sta. 12: 63. 1890.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth, the lower sometimes pubescent; ligule short; leaves 3′–9′ long, 1″–3″ wide, smooth beneath, rough above; spike 3′–8′ in length, sometimes one-sided, often nodding at the top; spikelets 3–6-flowered; empty scales 4½″–6″ long; 3–5-nerved, acuminate, awn-pointed or bearing an awn 1″–3″ long; flowering scales 4″–5″ long, usually scabrous toward the apex, acuminate into an awn sometimes twice their own length.

New Brunswick to British Columbia, south to North Carolina, Tennessee and Colorado. Also in Europe and Asia. Native northward; southward locally naturalized from Europe. July–Aug.

89. HÓRDEUM L. Sp. Pl. 84. 1753.

Annual or perennial grasses, with flat leaves and terminal cylindric spikes. Spikelets 1-flowered, usually in 3's at each joint of the rachis, the lateral generally short-stalked and imperfect; rachilla produced beyond the flower, the lower empty scales often reduced to awns and forming an apparent involucre around the spikelets. Empty scales rigid; flowering scales rounded on the back, 5-nerved at the apex, awned; palet scarcely shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Grain usually adherent to the scale, hairy at the summit. [Latin name for Barley.]

About 16 species, widely distributed in both hemispheres.

Flowering scales, exclusive of awns, 3″–4″ long.	
Awn of the flowering scale ½′ long or less.	
All the empty scales of each cluster bristle-like.	1. *H. nodosum.*
Four of the empty scales of each cluster dilated above the base.	2. *H. pusillum.*
Awn of the flowering scale 1′ long or more.	3. *H. jubatum.*
Flowering scales, exclusive of awns, about 6″ long.	4. *H. murinum.*

1. Hordeum nodòsum L. Meadow Barley. (Fig. 529.)

Hordeum nodosum L. Sp. Pl. Ed. 2, 126. 1762.

Hordeum pratense Huds. Fl. Angl. Ed. 2, 56. 1762.

Culms 6′–2° tall, erect, or sometimes decumbent, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ¼″ long, truncate; leaves 1½′–5′ long, 1″–3″ wide, flat, rough; spike 1′–3½′ in length; spikelets usually in 3's, the central one containing a palet and perfect flower, the lateral enclosing a staminate or rudimentary flower, or a palet only; empty scales of each cluster awn-like; flowering scale of the central spikelet 3″–4″ long exclusive of the awn, which is 3″–6″ long, the corresponding scale in the lateral spikelets much smaller and short-stalked.

In meadows and waste places, Indiana to Minnesota, British Columbia and Alaska, south to Texas and California. Also in Europe and Asia. June–July.

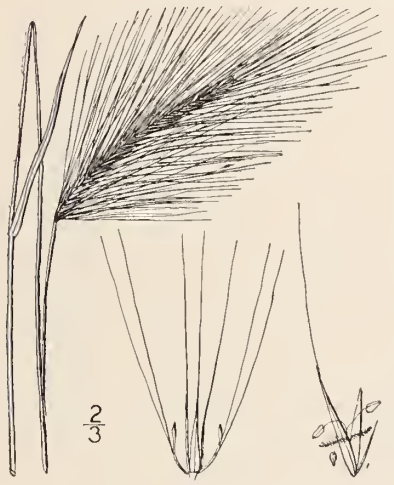
2. Hordeum pusillum Nutt. Little Barley. (Fig. 530.)

Hordeum pusillum Nutt. Gen. 1: 87. 1818.

Culms 4′–15′ tall, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, usually shorter than the internodes, smooth and glabrous, the upper often enclosing the base of the spike; ligule very short; leaves ½′–3′ long, ½″–2″ wide, erect, smooth beneath, rough above; spike 1′–3′ in length; spikelets usually in 3's, the central one containing a palet and perfect flower, the lateral imperfect; scales awned, the empty ones scabrous, those of the central spikelet and the lower ones of the lateral spikelets dilated above the base; flowering scale smooth, that of the central spikelet 3″–4″ long, short-awned, the corresponding scale in the lateral spikelets smaller and very short-stalked.

In dry soil, Ontario to British Columbia, south to Nebraska, Arkansas, Texas and California; also sparingly introduced along the coast from Virginia to Florida. June–July.

3. Hordeum jubàtum L. Squirrel-tail Grass. (Fig. 531.)



Hordeum jubatum L. Sp. Pl. 85. 1753.

Culms 10′–2½° tall, erect, simple, usually slender, smooth and glabrous. Sheaths usually shorter than the internodes, generally loose, smooth and glabrous; ligule ½″ long or less; leaves 1′–5′ long, 1″–2″ wide, erect, rough; spike 2′–4′ in length; spikelets usually in 3's, the central one containing a palet and perfect flower, the lateral imperfect; empty scales consisting of slender rough awns 1′–2½′ long; flowering scale of the central spikelet 3″–4″ long, scabrous at the apex, bearing a slender rough awn 1′–2½′ long; the corresponding scale in the lateral spikelets short-awned, about 3″ long including its pedicel, sometimes reduced to a rudiment.

In dry soil, Ontario to Alaska, south to Kansas, Colorado and California. Naturalized in the east from Labrador and Quebec to New Jersey and Pennsylvania. July–Aug.

4. Hordeum murìnum L. Wall Barley. (Fig. 532.)

Hordeum murinum L. Sp. Pl. 85. 1753.

Culms 6′–2° tall, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, shorter than the internodes on the long culms, overlapping on the short ones, the uppermost often inflated and enclosing the base of the spike; ligule very short; leaves 1′–6′ long, 1″–3″ wide, rough; spikes 2′–4′ in length; spikelets usually in 3's; scales awned, the empty ones awn-like, scabrous, those of the central spikelet broader and ciliate on the margins, bearing awns 9″–12″ long, those of the lateral spikelets similar, with the exception of the second scale, which is not ciliate; flowering scales scabrous at the apex, bearing an awn about 1′ long, those of the lateral spikelets about 6″ long, the corresponding scale in the central spikelet somewhat smaller.

On ballast and sparingly in waste places, southern New York and New Jersey. Also from Arizona to California. Adventive or naturalized from Europe. June–July.

90. ÉLYMUS L. Sp. Pl. 83. 1753.

Tall grasses, with usually flat leaves and dense terminal spikes. Spikelets 2–several-flowered, (rarely 1-flowered) sessile, usually in pairs, occasionally in 3's or more, in alternate notches of the continuous or jointed rachis, the empty scales forming an apparent involucre to the cluster. Two lower scales empty, narrow, acute or awned, entire or rarely cleft; flowering scales shorter, rounded on the back, 5-nerved, usually bearing an awn. Palet a little shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain sparsely hairy at the summit, adherent to the palet. [Greek, to roll up, referring to the involute palet.]

About 30 species, natives of temperate regions. Besides the following, some 10 others occur in the western parts of North America.

Joints of the rachis tardily separating at maturity; awns ascending or none.
- Flowering scales conspicuously awned (rarely awnless in No. 2).
  - Spikelets divergent from the rachis of the broad spike.
    - Empty scales awl-shaped; spikes slender. 1. *E. striatus.*
    - Empty scales not awl-shaped; spikes stout.
      - Empty scales lanceolate, 5–7-nerved; awn short; spike erect. 2. *E. Virginicus.*
      - Empty scales narrowly lanceolate, 3–5-nerved; awn about the length of the scale; spike usually nodding. 3. *E. Canadensis.*
  - Spikelets appressed to the rachis of the narrow spike.
    - Empty scales narrowly lanceolate, acuminate or awn-pointed. 4. *E. glaucus.*
    - Empty scales awl-shaped, bearing awns equalling or exceeding their length. 5. *E. Macounii.*
- Flowering scales unawned or awn-pointed.
  - Flowering scales glabrous. 6. *E. condensatus.*
  - Flowering scales villous. 7. *E. arenarius.*

Joints of the rachis early separating; awns widely diverging. 8. *E. elymoides.*

1. Elymus striàtus Willd. Slender Wild Rye. (Fig. 533.)

Elymus striatus Willd. Sp. Pl. 1: 470. 1797.
Elymus striatus var. *villosus* A. Gray, Man. 603. 1848.

Culms 2°–3° tall, erect, slender, simple, smooth, glabrous. Sheaths usually shorter than the internodes, glabrous or hirsute; ligule very short; leaves 5′–9′ long, 2″–5″ wide, smooth or slightly rough beneath, pubescent above; spike 2½′–4½′ in length, broad, slender, dense; spikelets divergent from the rachis, 1–3-flowered; empty scales awl-shaped, 9″–12″ long, including the slender rough awn, 1–3-nerved, the nerves, and often the whole scale, rough, hispid or hirsute; flowering scales about 3″ long, smooth, scabrous or hispid, bearing a slender rough awn 8″–15″ in length.

In woods and on banks, Maine and Ontario to Tennessee and Kansas. Spike often nodding. June–July.

2. Elymus Virgínicus L. Terrell-grass. Virginia Wild Rye. (Fig. 534.)

Elymus Virginicus L. Sp. Pl. 84. 1753.
Elymus Virginicus var. *submuticus* Hook. Fl. Bor. Am. 2: 255. 1840.

Culms 2°–3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, often overlapping on the lower part of the culm, smooth, sometimes pubescent, the uppermost often inflated and enclosing the peduncle and the base of the spike; ligule very short; leaves 5′–14′ long, 2″–8″ wide, rough; spike 2′–7′ in length, broad, stout, upright; spikelets divergent from the rachis, 2–3-flowered; empty scales thick and rigid, lanceolate, 8″–12″ long, including the short awn, 5–7-nerved; flowering scales 3″–4″ long, smooth, rarely sparingly scabrous, bearing a rough awn 2″–9″ in length, or rarely awnless.

In moist soil, especially along streams, Nova Scotia and New Brunswick to Manitoba, south to Florida and Texas. Ascends to 2000 ft. in North Carolina. July–Aug.

3. Elymus Canadénsis L. Nodding Wild Rye. (Fig. 535.)

Elymus Canadensis L. Sp. Pl. 83. 1753.
Elymus glaucifolius Willd. Enum. 1: 131. 1809.
Elymus Canadensis var. *glaucifolius* Torr. Fl. U. S. 1: 137. 1824.

Culms 2½°–5° tall, erect, simple, smooth and glabrous. Sheaths usually overlapping; ligule very short; leaves 4′–1° long or more, 2″–10″ wide, rough, sometimes glaucous; spike 4′–12′ in length, broad, stout, often nodding, its peduncle much exserted; spikelets divergent from the rachis, 3–5-flowered; empty scales narrowly lanceolate or awl-shaped, rigid, 3–5-nerved, 8″–16″ long, including the long slender rough awns; flowering scales 4″–7″ long, nearly smooth to hirsute, bearing a slender scabrous straight or divergent awn 10″–25″ in length.

On river banks, Nova Scotia and New Brunswick to Alberta, south to Georgia, Texas and New Mexico. Ascends to 2100 ft. in Virginia. July–Aug.

4. Elymus glaùcus Buckl. Smooth Wild Rye. (Fig. 536.)

Elymus glaucus Buckl. Proc. Acad. Phila. **1862**: 99. 1862.
Elymus Americanus V. & S.; Macoun, Cat. Can. Pl. 4: 245. 1888.
Elymus Sibiricus var. *Americanus* Wats. & Coult. in A. Gray, Man. Ed. 6, 673. 1890.

Culms 2°–5° tall, erect, simple, smooth and glabrous. Sheaths often shorter than the internodes, usually glabrous, rarely pubescent; ligule 1″ long or less; leaves 4′–12′ long, 2″–8″ wide, smooth beneath, sometimes rough above; spike 3′–8′ in length, narrow, slender; spikelets appressed to the rachis, 3–6-flowered; empty scales narrowly lanceolate, 4″–6″ long, acuminate or awn-pointed, rigid, 3–5-nerved; flowering scales smooth or slightly rough, 5″–6″ long, bearing a slender straight rough awn 6″–9″ in length.

In moist soil, Ontario to British Columbia, south to Michigan, Arizona and California. June–Aug.

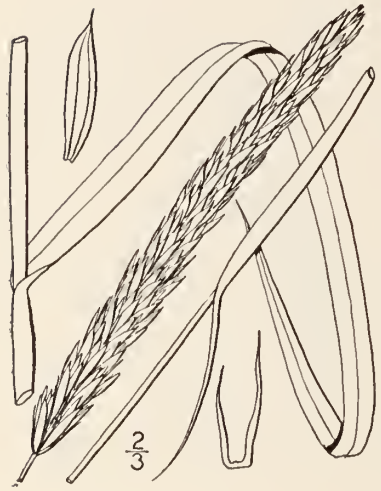
5. Elymus Macoùnii Vasey. Macoun's Wild Rye. (Fig. 537.)

Elymus Macounii Vasey, Bull. Torr. Club, **13**: 119. 1886.

Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule very short, truncate; leaves 2′–6′ long, 1″–2½″ wide, rough, especially above; spike 2′–5′ in length, narrow, slender, often somewhat flexuous; spikelets appressed to the rachis, single at each node, or the lower sometimes in pairs, 1–3-flowered; empty scales (occasionally 3) awl-shaped, 3-nerved, rough, 3″–4″ long, bearing a slender straight rough awn, 3″–5″ in length; flowering scales 3½″–5″ long, rough toward the apex, bearing a slender straight awn 3″–5″ long.

Prairies, Manitoba and Assiniboia, south to Nebraska and New Mexico. July–Aug.

6. Elymus condensàtus Presl. Smooth Lyme-grass. (Fig. 538.)

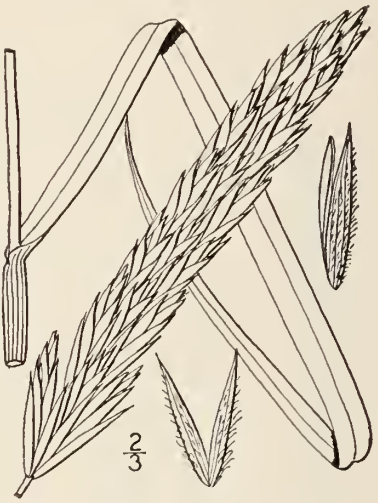


Elymus condensatus Presl, Reliq. Haenk. 1: 265. 1830.

Culms 2°–10° tall, erect, simple, smooth and glabrous. Sheaths smooth and glabrous, the upper ones shorter than the internodes; ligule 2″–3″ long, truncate; leaves 6′–1° long or more, 3″–12″ wide, scabrous, at least above; spike 4′–15′ in length, usually stout, strict, often interrupted below, sometimes compound at the base; spikelets 3–6-flowered, 2-several at each node of the rachis; empty scales awl-shaped, 4½″–6″ long, 1-nerved, usually rough; flowering scales 4″–5″ long, generally awn-pointed, usually rough, sometimes smooth.

In wet saline situations, Alberta to British Columbia, south to northwestern Nebraska, Arizona and California. July–Aug.

7. Elymus arenàrius L. Downy Lyme-grass. Sea Lyme-grass. (Fig. 539.)



Elymus arenarius L. Sp. Pl. 83. 1753.

Culms 1½°–8° tall, erect, simple, usually softly pubescent at the summit. Sheaths smooth and glabrous, often glaucous, those at the base overlapping, the upper shorter than the internodes; ligule very short; leaves 3′–1° long or more, 1½″–5″ wide, flat, or becoming involute, smooth beneath, rough above; spike 3′–10′ in length, usually strict; spikelets 3–6-flowered, frequently glaucous; empty scales 8″–14″ long, 3–5-nerved, acuminate, more or less villous; flowering scales 8″–10″ long, acute or awn-pointed, 5–7-nerved, usually very villous.

On shores, Greenland and Labrador to the Northwest Territory and Alaska, south to Maine, Lake Superior and Washington. Also in Europe and Asia. Summer.

8. Elymus elymoides (Raf.) Swezey. Long-bristled Wild Rye. (Fig. 540.)

Sitanion elymoides Raf. Journ. Phys. 89: 103. 1819.
Elymus Sitanion Schultes, Mant. 2: 426. 1824.
Elymus elymoides Swezey, Neb. Fl. Pl. 15. 1891.

Culms 6′–2° tall, erect, simple, smooth, glabrous. Sheaths smooth or rough, sometimes hirsute, usually overlapping, the upper one often inflated and enclosing the base of the spike; ligule short; leaves 2′–7′ long, ½″–2″ wide, often stiff and erect, usually rough, sometimes hirsute, flat or involute; spike 2′–6′ in length; spikelets 1–5-flowered; empty scales entire or divided, often to the base, the divisions awl-shaped and bearing long unequal slender awns, 1′–3½′ in length; flowering scales 3″–5″ long, 5-nerved, scabrous, at least toward the apex, bearing a long slender divergent awn 1′–3½′ in length, the apex of the scale sometimes 2-toothed, the teeth often produced into short awns; joints of the rachis separating at maturity.

In dry soil, South Dakota to Oregon, south to Kansas, Texas, Arizona and California. July–Aug.

91. HÝSTRIX Moench, Meth. 294. 1794.

[Asprella Willd. Enum. 132. 1809. Not Schreb. 1789.]
[Gymnostichum Schreb. Beschr. Gras. 2: 127. *pl. 47.* 1810.]

Usually tall grasses, with flat leaves and terminal spikes. Spikelets 2–several-flowered, in pairs, rarely in 3's, at each node of the rachis. Empty scales wanting, or sometimes appearing as mere rudiments; flowering scales narrow, convolute, rigid, rounded on the back, 5-nerved above, terminating in an awn; palet scarcely shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain oblong, adhering to the palet when dry. [Greek name of the Porcupine, referring to the long awns.]

Four known species, the following and a Californian one occurring in North America.

1. Hystrix Hýstrix (L.) Millsp. Bottle-brush Grass. (Fig. 541.)

Elymus Hystrix L. Sp. Pl. Ed. 2, 124. 1762.
Asprella Hystrix Willd. Enum. 132. 1809.
Gymnostichum Hystrix Schreb. Beschr. Gras. 2: 127. *pl. 47.* 1810.
Hystrix Hystrix Millsp. Fl. W. Va. 474. 1892.

Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 4½′–9′ long, 3″–6″ wide, smooth beneath, rough above; spike 3′–7′ in length, spikelets at length widely spreading, 4″–6″ long, exclusive of the awns; empty scales awn-like, usually present in the lowest spikelet; flowering scales 4″–6″ long, acuminate into an awn about 1′ in length.

In rocky woods, New Brunswick to Ontario, south to Georgia, Illinois and Minnesota. Ascends to 2100 ft. in Virginia. Spikelets very easily detached, even when young. June–July.

92. ARUNDINÀRIA Michx. Fl. Bor. Am. 1: 73. 1803.

Arborescent or shrubby grasses, with simple or branched culms and flat short-petioled leaves which are articulated with the sheath. Spikelets borne in panicles or racemes, 2–many-flowered, large, compressed. Empty scales 1 or 2, the first sometimes wanting; flowering scales longer, not keeled, many nerved; palets scarcely shorter than the scales, prominently 2-keeled. Lodicules 3. Stamens 3. Styles 2 or 3. Stigmas plumose. Grain furrowed, free, enclosed in the scale and palet. [From *Arundo*, the Latin name of the Reed.]

About 24 species, natives of Asia and America. Two are found in the southern United States.

1. Arundinaria técta (Walt.) Muhl. Scutch Cane. Small Cane. (Fig. 542.)

Arundo tecta Walt. Fl. Car. 81. 1788.
Arundinaria tecta Muhl. Gram. 191. 1817.
Arundinaria macrosperma var. *suffruticosa* Munro, Trans. Linn. Soc. **26**: 15. 1868.

Culms 3°–15° tall, erect, shrubby, branching at the summit, smooth and glabrous. Sheaths longer than the internodes, smooth or rough, ciliate on the margins; ligule bristly; leaves lanceolate, 3½′–8′ long, 4″–12″ wide, flat, more or less pubescent beneath, glabrous above; racemes terminal, or on short leafless culms; spikelets 7–10-flowered, 1′–1½′ long, on pedicels 1′ in length or less, which are sometimes pubescent; empty scales unequal, the first usually very small, sometimes wanting; flowering scales 6″–10″ long, acute or acuminate, smooth, scabrous or pubescent.

In swamps and moist soil, Maryland to Indiana and Missouri, Florida and Texas. May–July.

Family 8. CYPERÀCEAE J. St. Hil. Expos. Fam. 1: 62. 1805.

SEDGE FAMILY.

Grass-like or rush-like herbs. Stems (culms) slender, solid (rarely hollow), triangular, quadrangular, terete or flattened. Roots fibrous (many species perennial by long rootstocks). Leaves narrow, with closed sheaths. Flowers perfect or imperfect, arranged in spikelets, one (rarely 2) in the axil of each scale (glume, bract), the spikelets solitary or clustered, 1–many-flowered. Scales 2-ranked or spirally imbricated, persistent or deciduous. Perianth hypogynous, composed of bristles, or interior scales, rarely calyx-like, or entirely wanting. Stamens 1–3, rarely more. Filaments slender or filiform. Anthers 2-celled. Ovary 1-celled, sessile or stipitate. Ovule 1, anatropous, erect. Style 2–3-cleft or rarely simple or minutely 2-toothed. Fruit a lenticular plano-convex or trigonous achene. Endosperm mealy. Embryo minute.

About 65 genera and 3000 species, of very wide geographic distribution. The dates given below indicate the time of perfecting fruit.

Flowers of the spikelets all, or at least one of them, perfect; spikelets all similar.
- Scales of the spikelets 2-ranked.
  - Perianth none; spikelets in solitary or umbelled terminal heads.
    - Spikelets with 2–several perfect flowers; scales several to numerous. 1. *Cyperus.*
    - Spikelets with but 1 perfect flower; scales 2–4. 2. *Kyllinga.*
  - Perianth of 6–9 bristles; inflorescence axillary. 3. *Dulichium.*
- Scales of the spikelets spirally imbricated all around.
  - Spikelets with several to many perfect flowers.
    - Base of the style swollen, persistent as a tubercle on the achene.
      - Leaves reduced to basal sheaths; bristles usually present; spikelet solitary. 4. *Eleocharis.*
      - Culm leafy; bristles none; spikelets 1–numerous.
        - Spikelets capitate, involucrate. 5. *Dichromena.*
        - Spikelets umbellate or cymose.
          - Spikelets in terminal and axillary compound cymes; most of the style persistent. 6. *Psilocarya.*
          - Spikelets in a terminal umbel, base of style persistent. 7. *Stenophyllus.*
    - Base of the style enlarged or narrow, deciduous.
      - Flowers with no broad sepals nor interior perianth-scales.
        - Style swollen at the base; bristles none. 8. *Fimbristylis.*
        - Style not swollen at the base; bristles usually present.
          - Spikelets solitary-many; bristles 1–6, rarely none. 9. *Scirpus.*
          - Spikelets solitary or few; bristles 6–many, soft, smooth, very long, slender, much exserted. 10. *Eriophorum.*
      - Flowers with a perianth of 3 stalked sepals or of 1 or 2 interior hyaline scales.
        - Perianth of 3 broad stalked sepals, usually alternating with as many bristles. 11. *Fuirena.*
        - Perianth of 1 or 2 hyaline scales (sepals?); bristles none.
          - Perianth of a single minute posterior scale. 12. *Hemicarpha.*
          - Perianth of 2 scales, convolute around the ovary. 13. *Lipocarpha.*
  - Spikelets 1–4-flowered, some of the flowers imperfect.
    - Style, or its base, persistent as a tubercle on the achene. 14. *Rynchospora.*
    - Style wholly deciduous. 15. *Cladium.*

Flowers all monoecious or dioecious, usually borne in separate small spikelets.
- Achene not enclosed in a utricle (perigynium).
  - Spikelets clustered or solitary, not in a terminal spike; achene bony. 16. *Scleria.*
  - Spikelets forming a terminal spike; arctic genera.
    - Scales 2-flowered, androgynous. 17. *Elyna.*
    - Scales 1-flowered, monoecious. 18. *Kobresia.*
- Achene enclosed in a utricle (perigynium).
  - Axis of the pistillate flower conspicuous, subulate, often exserted beyond the perigynium. 19. *Uncinia.*
  - Axis of the pistillate flower rudimentary or none, not exserted. 20. *Carex.*

1. CYPÈRUS L. Sp. Pl. 44. 1753.

Annual or perennial sedges. Culms in our species simple, triangular, leafy near the base, and with 1 or more leaves at the summit, forming an involucre to the simple or compound, umbellate or capitate inflorescence. Rays of the umbel sheathed at the base, usually very unequal, one or more of the heads or spikes commonly sessile. Spikelets flat or subterete, composed of few or many scales, the scales falling away from the wingless or winged rachis as they mature (nos. 1–19), or persistent and the spikelets falling away from the axis of the head or spike with the scales attached (nos. 20–32). Scales concave, conduplicate or keeled, 2-ranked, all flower-bearing or the lower ones empty. Flowers perfect. Perianth none. Stamens 1–3. Style 2–3-cleft, deciduous from the summit of the lenticular or 3-angled achene. [Ancient Greek name for these sedges.]

About 650 species, of wide distribution in tropical and temperate regions. Besides the following, some 40 others occur in the southern United States. The English names *Galingale* and *Sweet Rush* are sometimes applied to all the species.

Style 2-cleft; achene lenticular, not 3-angled; scales falling from the rachis; spikelets flat.
Achene one-half as long as the scale; umbel nearly or quite simple.
Spikelets yellow; superficial cells of the achene oblong. 1. *C. flavescens.*
Spikelets green or brown; superficial cells of the achene quadrate.
Scales obtuse or obtusish, appressed.
Scales membranous, dull; style much exserted. 2. *C. diandrus.*
Scales subcoriaceous, shining; style scarcely exserted. 3. *C. rivularis.*
Scales acute, somewhat spreading at maturity.
Achene narrowly obovate; spikelets ½′–1½′ long. 4. *C. Nuttallii.*
Achene linear-oblong; spikelets 3″–9″ long. 5. *C. microdontus.*
Achene nearly as long as the scale; umbel sometimes much compound. 6. *C. flavicomus.*
Style 3-cleft; achene 3-angled.
Scales falling away from the persistent rachis of the flattened spikelets.
Wings of the rachis, if present, permanently adnate to it.
Scales tipped with recurved awns; low annual, 1′–6′ tall. 7. *C. inflexus.*
Scales acute or obtuse, not awned.
Wings of the rachis none or very narrow.
Stamens 3; spikelets linear-oblong, 4″–12″ long; scales acute.
Annual; culms smooth, 2′–10′ long. 8. *C. compressus.*
Perennial; culms rough, 1°–2½° tall. 9. *C. Schweinitzii.*
Stamen 1; spikelets ovate, 2″–4″ long.
Tall perennial; achene linear; scales acutish. 10. *C. pseudovegetus.*
Low annual; achene oblong; scale-tips recurved. 11. *C. acuminatus.*
Wings of the rachis distinct.
Low annual, adventive from Europe; scales brown. 12. *C. fuscus.*
Tall indigenous perennials (no. 13 sometimes annual?).
Lower leaves reduced to pointed sheaths. 13. *C. Haspan.*
Leaves all elongated-linear.
Scales mucronate, reddish brown or green. 14. *C. dentatus.*
Scales acute or obtuse, not mucronate.
Scales wholly or partly purple-brown; achene linear.
Scales tightly appressed. 15. *C. rotundus.*
Tips of the scales free. 16. *C. Hallii.*
Scales straw-colored; achene obovoid. 17. *C. esculentus.*
Wings of the rachis separating from it as interior scales; annuals.
Spikes loose; spikelets 3″–10″ long. 18. *C. erythrorhizos.*
Spikes dense, cylindric; spikelets 1½″–2½″ long. 19. *C. Halei.*
Spikelets falling away from the axis of the spikes, the lower pair of scales commonly persistent.
Annuals; spikelets elongated, nearly terete.
Scales imbricated; achene obovoid.
Scales thin, dull brown; spikelets very slender. 20. *C. speciosus.*
Scales rigid, yellow-brown; spikelets stout. 21. *C. ferox.*
Scales distant; achene linear-oblong. 22. *C. Engelmanni.*
Perennial by hard, tuber-like basal corms; spikelets more or less flattened.
Achene narrowly linear-oblong, 3–4 times as long as thick.
Spikelets flat, several–many-flowered. 23. *C. strigosus.*
Spikelets subterete, few-flowered.
Spikelets 6″–12″ long, loosely spicate; lower reflexed. 24. *C. refractus.*
Spikelets 1½″–6″ long, densely capitate or spicate.
Spikelets all reflexed; culms rough. 25. *C. retrofractus.*
Spikelets spreading or only the lower reflexed; culms smooth.
Heads oblong or cylindric.
Spikelets 3″–5″ long, the lower reflexed. 26. *C. Lancastriensis.*
Spikelets 1½″–2″ long, the lower spreading. 27. *C. cylindricus.*
Heads globose. 28. *C. ovularis.*
Achene oblong or obovoid, about twice as long as thick.
Rachis wingless or very narrowly winged.
Scales pale green, membranous, dull. 29. *C. filiculmis.*
Scales chestnut-brown, firm, shining. 30. *C. Houghtoni.*
Rachis-wings membranous, broad.
Scales firm, not appressed; spikelets loosely capitate. 31. *C. Grayi.*
Scales thin, closely appressed; spikelets densely capitate. 32. *C. echinatus.*

1. Cyperus flavéscens L. Yellow Cyperus. (Fig. 543.)

Cyperus flavescens L. Sp. Pl. 46. 1753.

Annual, culms very slender, tufted, leafy below, 3′–12′ tall, mostly longer than the leaves. Leaves 1″–1½″ wide, smooth, the longer usually exceeding the inflorescence; clusters terminal and sessile or on 1–4 short rays; spikelets in 3's–6's, linear, subacute, yellow, many-flowered, flat, 4″–9″ long, 1½″–2″ broad; scales ovate, obtuse, 1-nerved, appressed, twice as long as the orbicular-obovate black obtuse lenticular shining achene; stamens 3; style deeply 2-cleft, its branches slightly exserted; superficial cells of the achene oblong.

In marshy ground, Maine to Michigan, Florida and Mexico. Also in the Old World. Aug.–Oct.

2. Cyperus diándrus Torr. Low Cyperus. (Fig. 544.)

Cyperus diandrus Torr. Cat. Pl. N. Y. 90. 1819.

Cyperus diandrus elongatus Britton, Bull. Torr. Club, 19: 226. 1892.

Annual, culms tufted, slender, 2′–15′ tall. Leaves about 1″ wide, those of the involucre usually 3, the longer much exceeding the spikelets; clusters sessile and terminal, or at the ends of 1–3 rays; spikelets 4″–9″ long, linear-oblong, acute, flat, many-flowered; scales ovate, green, brown, or with brown margins, obtuse, 1-nerved, appressed, membranous, dull; stamens 2 or 3; style 2-cleft, its branches much exserted; achene lenticular, oblong, subacute, gray, not shining, one-half as long as the scale, its superficial cells quadrate, about as long as wide.

In marshy places New Brunswick to Minnesota, south to South Carolina and Kansas. Aug.–Oct.

The var. *elongatus* is only a form with longer spikelets, found in southern New York and New Jersey.

3. Cyperus rivulàris Kunth. Shining Cyperus. (Fig. 545.)

Cyperus rivularis Kunth, Enum. 2: 6. 1837.

Cyperus diandrus var. (?) *castaneus* Torr. Ann. Lyc. N. Y. 3: 252. 1836. Not *C. castaneus* Willd. 1798.

Similar to the preceding species, culms slender, tufted, 4′–15′ tall. Umbel usually simple; spikelets linear or linear-oblong, acutish, 4″–10″ long; scales green or dark brown or with brown margins, appressed, firm, subcoriaceous, shining, obtuse; stamens mostly 3; style 2-cleft, scarcely exserted; achene oblong or oblong-obovate, lenticular, somewhat pointed, dull, its superficial cells quadrate.

In wet soil, especially along streams and ponds, Maine to southern Ontario and Michigan, south to Virginia and Missouri. Aug.–Oct.

4. Cyperus Nuttàllii Eddy. Nuttall's Cyperus. (Fig. 546.)

Cyperus Nuttallii Eddy; Spreng. Neue Entd. 1: 240. 1820.

Annual, culms slender, tufted, 4′–18′ tall, equalling or often longer than the leaves. Leaves of the involucre 3–5, spreading, the larger often 5′ long; umbel simple or slightly compound, 3–7-rayed; spikelets rather loosely clustered, linear, very acute, flat, spreading, ½′–1½′ long, 1″–1½″ wide; scales yellowish-brown with a green keel, oblong, acute, rather loosely spreading at maturity; stamens 2; style 2-cleft, its branches somewhat exserted; achene lenticular, narrowly obovate, obtuse or truncate, dull, light brown, one-third to one-half as long as the scale, its superficial cells quadrate.

Salt marshes, Maine to Mississippi. Aug.–Oct.

5. Cyperus microdóntus Torr. Coast Cyperus. (Fig. 547.)

Cyperus microdontus Torr. Ann. Lyc. N. Y. 3: 255. 1836.

Annual, similar to the preceding species, culms very slender, tufted, sometimes 20′ high, usually lower. Leaves about 1″ wide, those of the involucre much elongated; umbel commonly simple, sessile, capitate, or 1–6-rayed; spikelets linear, acute, 3″–9″ long, less than 1″ wide, yellowish-brown; scales ovate, acute, thin, appressed when young, spreading at maturity; stamens 2; style 2-cleft, its branches much exserted; achene lenticular, linear-oblong, short-pointed, light brown, one-half as long as the scale, its superficial cells quadrate.

In wet soil, on or near the coast, Virginia to Florida and Texas. Aug.–Oct.

6. Cyperus flavícomus Michx. Elegant Cyperus. (Fig. 548.)

Cyperus flavicomus Michx. Fl. Bor. Am. 1: 27. 1803.

Annual, culms stout or slender, 1°–3° tall, leafy below. Leaves smooth, or rough-margined, 2″–3″ wide, those of the involucre 3–8, the longer ones much exceeding the inflorescence; umbels few–several-rayed, often compound; primary rays ½′–2½′ long; spikelets numerous, usually densely clustered, linear, acute, 4″–10″ long, 1″–1½″ wide, flat, many-flowered, spreading; scales oblong, obtuse, thin, dull, yellowish-brown, scarious-margined, faintly 3-nerved; stamens 3; style 2-cleft, little exserted; achenes obovate, lenticular, black, mucronate, not shining, nearly as long as the scales and often persistent on the rachis after these have fallen away.

In wet or moist sandy soil, Virginia to Florida and Louisiana. Aug.–Oct.

7. Cyperus infléxus Muhl. Awned Cyperus. (Fig. 549.)

Cyperus inflexus Muhl. Gram. 16. 1817.

Cyperus aristatus Boeckl. Linnaea. 35: 500, in part. 1868. Not Rottb. 1773.

Annual, culms slender or almost filiform, tufted, 1′–6′ tall, about equalled by the leaves. Leaves 1″ wide or less, those of the involucre 2–3, exceeding the umbel; umbel sessile, capitate, or 1–3-rayed; spikelets linear-oblong, 6–10-flowered, 2″–3″ long; scales light brown, lanceolate, rather firm, strongly several-nerved, tapering into a long, recurved awn, falling from the rachis at maturity; stamen 1; style 3-cleft; rachis narrowly winged, the wings persistent; achene 3-angled, brown, dull, narrowly obovoid or oblong, obtuse, mucronulate.

In wet, sandy soil, Vermont to the Northwest Territory and Oregon, south to Florida, Texas, California and Mexico. Fragrant in drying. July–Sept.

8. Cyperus compréssus L. Flat Cyperus. (Fig. 550.)

Cyperus compressus L. Sp. Pl. 46. 1753.

Annual, tufted, culms slender, erect or reclining, smooth, 3′–10′ long. Leaves light green, about 1″ wide, those of the involucre 2–3, the longer exceeding the spikelets; umbel capitate or with 2–3 short rays; spikelets narrowly lanceolate, acute, 4″–10″ long, 1½″–2″ wide, very flat, many-flowered; scales light green with a yellow band on each side, ovate, acuminate, firm, keeled, several-nerved, falling away from the narrowly-winged rachis at maturity; stamens 3; style 3-cleft; achene sharply 3-angled, obovoid, obtuse, dull, brown, about one-third as long as the scale.

In fields, Maryland to Florida, west to Missouri and Texas. Also in tropical America and in the warmer parts of Asia and Africa. Aug.–Oct.

9. Cyperus Schweinítzii Torr. Schweinitz's Cyperus. (Fig. 551.)

Cyperus Schweinitzii Torr. Ann. Lyc. N. Y. 3: 276. 1836.

Perennial by the thickened corm-like bases of the culms, tufted, culms rather slender, rough, at least above, 1°–2½° tall, about equalled by the light green leaves. Leaves 1″–2½″ wide, rough-margined, those of the involucre 3–7, erect, the longer exceeding the inflorescence; umbel simple, 3–9-rayed, the rays erect, sometimes 4′ long; spikelets flat, in rather loose ovoid spikes, which are sessile and at the ends of the rays, linear-oblong, 6–12-flowered, 4″–8″ long; scales convex, light green, ovate, acute or acuminate, 9–13-nerved, falling away from the rachis at maturity; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, brown, acute at each end, nearly as long as the scale, its superficial cells quadrate.

In sandy soil, especially along lakes and streams, western New York and southern Ontario to the Northwest Territory, Minnesota and Kansas. Aug.–Oct.

10. Cyperus pseudovégetus Steud. Marsh Cyperus. (Fig. 552.)

Cyperus pseudovegetus Steud. Syn. Pl. Cyp. 24. 1855.
Cyperus calcaratus Nees; S. Wats. in A. Gray, Man. Ed. 6, 570. 1890.

Perennial by thickened tuber-like joints of the rootstocks, culm rather stout, 1°–4° high, often equalled by the leaves. Leaves 1½″–2″ wide, smooth, nodulose, the midvein prominent; leaves of the involucre 4–6, spreading, the longer much exceeding the inflorescence; umbel several-rayed, compound, the primary rays often 4′ long; spikelets ovate, flat, many-flowered, light green, densely capitate, 2″–3″ long; scales keeled, conduplicate, 1-nerved, curved, acute, longer than the linear 3-angled slightly stalked achene; stamen 1; style 3-cleft.

In marshes, Delaware to Florida, west to Kansas and Texas. July–Sept.

11. Cyperus acuminàtus Torr. & Hook. Short-pointed Cyperus. (Fig. 553.)

Cyperus acuminatus Torr. & Hook. Ann. Lyc. N. Y. 3: 435. 1836.

Annual, culms very slender, tufted, 3′–15′ tall, longer than or equalling the leaves. Leaves light green, usually less than 1″ wide, those of the involucre much elongated; umbel 1–4-rayed, simple; rays short; spikelets flat, ovate-oblong, obtuse, 2″–4″ long, many-flowered, densely capitate; scales oblong, pale green, 3-nerved, coarsely cellular, conduplicate, with a short sharp more or less recurved tip; stamen 1; style 3-cleft; achene sharply 3-angled, gray, oblong, narrowed at each end, about one-half as long as the scale.

In moist soil, Illinois to Louisiana, west to Kansas, Oregon, Texas and California. July–Oct.

12. Cyperus fúscus L. Brown Cyperus. (Fig. 554.)

Cyperus fuscus L. Sp. Pl. 46. 1753.

Annual, culms slender, tufted, 6′–15′ high, longer than or equalled by the leaves. Leaves rather dark green, about 1″ wide, those of the involucre 4–6, the longer much exceeding the inflorescence; umbel several-rayed, somewhat compound, the rays short; spikelets linear, 2″–7″ long, less than 1″ wide, many-flowered, acute; scales ovate, subacute, becoming dark brown or remaining greenish on the keel, faintly about 3-nerved on the back, separating from the narrowly winged rachis as they mature; stamens 2 or 3; style 3-cleft; achene sharply 3-angled, oblong, pointed at each end, nearly as long as the scale.

Revere Beach, Mass., and New London, Conn. Adventive or fugitive from Europe. Also in ballast about the eastern seaports. July–Sept.

13. Cyperus Háspan L. Sheathed Cyperus. (Fig. 555.)

Cyperus Haspan L. Sp. Pl. 45. 1753.

Perennial by short rootstocks (sometimes annual?), roots fibrous, culms slender, weak, tufted, 1°–3° high. Lower leaves reduced to membranous acuminate sheaths, those of the involucre about 2, usually less than 1″ wide, commonly little exceeding or shorter than the inflorescence; umbel several-rayed, simple or compound, the longer rays 1′–2′ long; spikelets few, capitate, linear, acute, many-flowered, 3″–6″ long, about ½″ wide; scales oblong or oblong-lanceolate, reddish-brown, acute, mucronulate, keeled, 3-nerved; rachis narrowly winged; stamens 3; style 3-cleft, scarcely exserted; achene 3-angled, broadly obovoid, obtuse, nearly white, very much shorter than the scale.

In swamps, Virginia to Florida and Texas, mostly near the coast. Also in tropical America and in the warmer parts of Europe, Asia and Australia. July–Sept.

14. Cyperus dentàtus Torr. Toothed Cyperus. (Fig. 556.)

Cyperus dentatus Torr. Fl. U. S. 1: 61. 1824.

Perennial by scaly rootstocks which sometimes bear small tubers, culms rather stiff, 8′–20′ tall, longer than or equalled by the leaves. Leaves keeled, 1″–2″ wide, those of the involucre 3–4, one or two of them usually exceeding the inflorescence; umbel several-rayed, somewhat compound; longer rays 1′–3′ long; spikelets linear, very flat, many-flowered, mostly blunt, 5″–10″ long, nearly 2″ wide; scales light reddish-brown, ovate-lanceolate, thin, keeled, 5–7-nerved, mucronate, separating from the rachis when mature, their tips spreading, causing the spikelet to appear toothed; stamens 3; style 3-cleft, the branches exserted; achene 3-angled, obtuse, mucronate, light brown, much shorter than the scale.

In sandy swamps and on river shores, Maine to northern New York, south to West Virginia and South Carolina. Scales often modified into tufts of small leaves. Aug.–Oct.

15. Cyperus rotúndus L. Nut-grass. (Fig. 557.)

Cyperus rotundus L. Sp. Pl. 45. 1753.
Cyperus Hydra Michx. Fl. Bor. Am. 1: 27. 1803.

Perennial by scaly tuber-bearing rootstocks, culm rather stout, 6′–20′ high, usually longer than the leaves. Leaves 1½′–3′ wide, those of the involucre 3–5, the longer equalling or exceeding the inflorescence; umbel compound or nearly simple, 3–8-rayed, the longer rays 2′–4½′ long; spikelets linear, closely clustered, few in each cluster, acute, 4″–10″ long, 1″–1½″ wide; scales dark purple-brown or with green margins and centre, ovate, acute, closely appressed when mature, about 3-nerved on the keel; stamens 3; style 3-cleft, its branches exserted; achene 3-angled, about one-half as long as the scale.

In fields, Virginia to Florida, west to Kansas and Texas. Adventive in or about ballast deposits at the eastern seaports. Also in tropical America, and widely distributed in the Old World. July–Sept.

16. Cyperus Hàllii Britton. Hall's Cyperus. (Fig. 558.)

Cyperus Hallii Britton, Bull. Torr. Club, 13: 211. 1886.

Perennial by scaly rootstocks, culm rather stout, 2°–3° tall, about equalled by the leaves. Basal leaves 2″–3″ wide; involucral leaves 3–6, the longer very much exceeding the inflorescence; umbel compound, its longer rays 3′–4′ long, the raylets sometimes 1′ long; spikelets numerous, loosely clustered, linear, 7–15-flowered, 5″–8″ long, 1″–1½″ wide; involucels setaceous; scales ovate, acute, strongly 7–9-nerved, dark reddish-brown or with lighter margins, their tips not appressed; stamens 3; style 3-cleft, its branches much exserted; achene linear-oblong, 3-angled, about one-half as long as the scale.

Kansas and the Indian Territory to Texas. July–Sept.

17. Cyperus esculéntus L. Yellow Nut-grass. (Fig. 559.)

Cyperus esculentus L. Sp. Pl. 45. 1753.
Cyperus phymatodes Muhl. Gram. 23. 1817.

Perennial by scaly horizontal tuber-bearing rootstocks, culm usually stout, 1°–2½° tall, commonly shorter than the leaves. Leaves light green, 2″–4″ wide, the midvein prominent; those of the involucre 3–6, the longer much exceeding the inflorescence; umbel 4–10-rayed, often compound; spikelets numerous in loose spikes, straw-color or yellowish-brown, flat, spreading, 6″–12″ long, 1½″ wide, many-flowered; scales ovate-oblong, subacute, 3–5-nerved; rachis narrowly winged; stamens 3; style 3-cleft; achene obovoid, obtuse, 3-angled.

In moist fields, New Brunswick to Minnesota, south to Florida and Texas. Also on the Pacific Coast from California to Alaska, in tropical America, and widely distributed in the Old World. Sometimes a troublesome weed. Aug.–Oct.

Cyperus esculéntus angustispicàtus Britton, Bull. Torr. Club, 13: 211. 1886.

Spikelets very slender, 1″ wide or less. Massachusetts to South Carolina and Missouri.

18. Cyperus erythrorhìzos Muhl. Red-rooted Cyperus. (Fig. 560.)

Cyperus erythrorhizos Muhl. Gram. 20. 1817.

Annual, culms tufted, stout or slender, 3′–2° tall. Leaves 1½″–4″ wide, rough-margined, the lower longer than or equalling the culm, those of the involucre 3–7, some of them 3–5 times as long as the inflorescence; umbel mostly compound, several-rayed; spikelets linear, subacute, 3″–10″ long, less than 1″ wide, compressed, many-flowered, clustered in oblong, nearly or quite sessile spikes; scales bright chestnut brown, oblong-lanceolate, mucronulate, appressed, separating from the rachis at maturity, the membranous wings of the rachis separating as a pair of hyaline interior scales; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, pointed at both ends, pale, one-half as long as the scale.

In wet soil, especially along streams, southern Ontario to Massachusetts and Florida, west to Missouri, Kansas, Texas and California. Aug.–Oct.

Cyperus erythrorhizos var. **pùmilus** Engelm. is a low form, not worthy of varietal rank.

19. Cyperus Hàlei Torr. Hale's Cyperus. (Fig. 561.)

Cyperus Halei Torr.; Britton, Bull. Torr. Club, 13: 213. 1886.

Annual, culm stout, 2°–3° tall, about equalled by the leaves. Leaves 3″–4″ wide, very rough-margined, those of the involucre 5–8, much elongated; umbel compound, several-rayed; spikes cylindric, sessile or very nearly so, exceedingly dense, ½′–1′ long; spikelets very numerous, linear, 1½″–2½″ long, ½″ wide, spreading; scales brown, keeled, indistinctly 5-nerved, oblong, mucronulate, separating from the rachis at maturity, the wings of the rachis separating as a pair of hyaline scales, as in the preceding species; stamens 3; style 3-cleft; achene 3-angled, minute.

In swamps, southern Missouri to Tennessee, Louisiana and Florida. July–Sept.

20. Cyperus speciòsus Vahl. Michaux's Cyperus. (Fig. 562.)

Cyperus speciosus Vahl, Enum. 2: 364. 1806.
Cyperus Michauxianus Schultes, Mant. 2: 123. 1824.

Annual, culms stout or slender, usually tufted, 5′–2° tall, reddish toward the base. Leaves rough-margined, 1½″–2½″ wide, shorter than or equalling the culm, the midvein prominent; leaves of the involucre much exceeding the umbel; umbel compound or nearly simple, 3–7-rayed, the primary rays 1′–5½′ long; involucels narrow; spikelets subterete, very narrowly linear, loosely or densely clustered, 4″–12″ long, less than 1″ thick, 10–30-flowered, falling away from the axis at maturity; scales dull brown, thin, appressed, densely imbricated, ovate, obtuse, faintly 3–5-nerved on the back; rachis-wings broad, clasping the achene, persistent; stamens 3; style 3-cleft, slightly exserted; achene pale, 3-angled, about one-half as long as the scale, its superficial cells nearly quadrate.

In marshes, Rhode Island to Ohio and Minnesota, south to Florida, Texas and California. July–Sept.

Cyperus speciòsus ferruginéscens (Boeckl.) Britton, Mem. Torr. Club, 5: 61. 1894.
Cyperus ferruginescens Boeckl. Linnaea, 36: 396. 1869–70.

Scales spreading or slightly recurved, reddish. Missouri to Texas and New Mexico.

Cyperus speciòsus pàrvus (Boeckl.) Britton, Bull. Torr. Club, 13: 214. 1886.
Cyperus parvus Boeckl. Linnaea, 36: 397. 1869–70.

Culm 1′–3′ high; umbel very simple, generally of but a single cluster of short spikelets. Missouri to New Mexico.

21. Cyperus fèrox Vahl. Coarse Cyperus. (Fig. 563.)

Cyperus ferox Vahl, Enum. 2: 357. 1806.

Annual, closely related to the preceding species, but with smooth-margined, shorter and broader leaves, those of the involucre sometimes but little exceeding the inflorescence. Umbel simple or somewhat compound, often compact, the rays mostly short; spikelets linear, subterete, 10–20-flowered, 8″–12″ long, about 1″ thick, falling away from the axis at maturity; scales ovate-oblong, appressed, imbricated, obtuse, rather firm, green and 7–9-nerved on the back, yellowish on the sides; stamens 3; style 3-cleft; rachis broadly winged; achene 3-angled, narrowly obovoid, obtuse.

In wet soil, Missouri to California and widely distributed in tropical America. Aug.–Oct.

22. Cyperus Engelmánni Steud. Engelmann's Cyperus. (Fig. 564.)

Cyperus Engelmanni Steud. Syn. Pl. Cyp. 47. 1855.

Annual, culms slender, 6′–2½° tall. Leaves elongated, 2″–3″ wide, flaccid, roughish on the margins, those of the involucre 4–6, the longer exceeding the umbel; umbel often compound, the raylets very short; spikelets often densely crowded, very narrowly linear, subterete, 6″–12″ long, 5–15-flowered; rachis narrowly winged; scales greenish-brown, oblong, obtuse, thin, faintly 3–5-nerved on the back, distant, the successive ones on each side of the spikelet separated by a space of about one-half their length; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, two-thirds as long as the scale.

In wet soil, Massachusetts to southern Ontario and Wisconsin, south to New Jersey and Missouri. Aug.–Oct.

23. Cyperus strigòsus L. Straw-colored Cyperus. (Fig. 565.)

Cyperus strigosus L. Sp. Pl. 47. 1753.

Perennial by basal tuber-like corms, culm rather stout, 1°–3° tall. Leaves somewhat rough-margined, 2″–3″ wide, the longer ones of the involucre much exceeding the umbel; umbel several-rayed, compound or nearly simple, some of the primary rays often 4′–6′ long, their sheaths terminating in 2 bristles; involucels setaceous; heads oblong or ovoid; spikelets flat, linear, 4″–9″ long, 1″ wide or less, 7–15-flowered, separating from the axis at maturity; scales straw-colored, oblong-lanceolate, subacute, strongly several-nerved, appressed or at length somewhat spreading; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, acute, about one-third as long as the scale.

In moist meadows, swamps or along streams, Maine and Ontario to Minnesota, south to Florida and Texas. Aug.–Oct.

Among the numerous forms of this species the following may be defined as varieties:

Cyperus strigòsus capitàtus Boeckl. Linnaea, 36: 347. 1869–70.

Umbel simple or nearly so; spikelets 4″–7″ long, densely capitate in subglobose heads. Range of the type.

Cyperus strigòsus compósitus Britton, Bull. Torr. Club, 13: 212. 1886.

Umbel very compound; heads cylindric; spikelets 3″–6″ long, 4–6-flowered. Southern New York and Pennsylvania to Alabama.

Cyperus strigòsus robústior Kunth, Enum. 2: 88. 1837.

Umbel compound; spikelets 8″–12″ long, 10–25-flowered. Range of the type.

24. Cyperus refráctus Engelm. Reflexed Cyperus. (Fig. 566.)

Cyperus refractus Engelm.; Boeckl. Linnaea, 36: 369. 1869–70.

Perennial by tuber-like corms, culm stout, smooth, 1°–3° tall. Leaves 2½″–4″ wide, rough-margined, elongated; umbel 6–13-rayed, usually compound, the longer rays sometimes 8′ long, their sheaths terminating in 1 or 2 short teeth; involucels setaceous; raylets filiform; spikelets very narrowly linear, loosely spicate, acute, flattish, 5″–12″ long, ½″ thick, 3–6-flowered, the upper spreading, the lower reflexed; scales yellowish-green, oblong-lanceolate, obtuse, closely appressed, 9–11-nerved, thin; stamens 3; style 3-cleft, its branches much exserted; achene narrowly linear, obtuse, apiculate, about 5 times as long as thick, and one-half as long as the scale.

In dry fields, New Jersey to North Carolina and Missouri. July–Sept.

25. Cyperus retrofráctus (L.) Torr. Rough Cyperus. (Fig. 567.)

Scirpus retrofractus L. Sp. Pl. 50. 1753.
Cyperus retrofractus Torr.; A. Gray, Man. 519. 1848.

Perennial by tuber-like corms, culm slender, rough-puberulent, at least above, mostly longer than the puberulent leaves, 1°–3° tall. Leaves 1½″–2½″ wide, those of the involucre 4–7, the longer not greatly exceeding the umbel, sometimes shorter; umbel simple; rays very slender, nearly erect, or spreading, 2′–6′ long, their sheaths 2-toothed; heads oblong or obovoid; spikelets linear-subulate, 3″–6″ long, about ½″ thick, 1–2-flowered, all soon strongly reflexed, separating from the axis at maturity; flowering scales lanceolate, acute, the upper one subulate, all strongly several-nerved; stamens 3; style 3-cleft; achene linear, 3-angled, obtuse, apiculate, two-thirds as long as the scale.

In dry, sandy soil, southern New Jersey to Florida, west to Kentucky, Arkansas and Texas. July–Sept.

26. Cyperus Lancastriénsis Porter. Lancaster Cyperus. (Fig. 568.)

Cyperus Lancastriensis Porter; A. Gray, Man. Ed. 5, 555. 1867.

Perennial by ovoid or oblong corms, culm slender, smooth, mostly longer than the leaves, 1°–2½° tall. Leaves 2″–3″ wide, those of the involucre 4–7, the longer much exceeding the inflorescence; umbel simple, 5–9-rayed, the longer rays 2′–4′ long, their sheaths nearly truncate; heads oval, obtuse, ½′–1′ long; spikelets densely clustered, 4″–5″ long, linear, subterete, 2–4-flowered, the lower reflexed, the middle ones spreading, all separating from the axis at maturity; scales green, strongly several-nerved, the flowering ones lanceolate, subacute; stamens 3; style 3-cleft; achene linear, obtuse, apiculate, 2–3 times as long as thick, two-thirds as long as the scale.

In dry fields, New Jersey and Pennsylvania to Virginia and Alabama. July–Sept.

27. Cyperus cylíndricus (Ell.) Britton. Pine-barren Cyperus. (Fig. 569.)

Mariscus cylindricus Ell. Bot. S. C. & Ga. 1: 74. 1816.
Cyperus cylindricus Britton, Bull. Torr. Club, 6: 339. 1879.
Cyperus Torreyi Britton, Bull. Torr. Club, 13: 215. 1886.

Perennial by small hard corms, culms slender, smooth, usually tufted, 4′-18′ tall, longer than the leaves. Leaves smooth, 1″–1½″ wide, the longer ones of the involucre much exceeding the umbel; umbel simple, several-rayed, the rays short, or the longer 1′–2½′ long, the sheaths 2-toothed; heads very dense, cylindric, ¼′–½′ long, 2″–4″ in diameter; spikelets 1½″–2″ long, flattish, 1–2-flowered, spreading or the lower reflexed; scales green, oblong; rachis winged; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, apiculate, slightly more than one-half as long as the scale.

In sandy pine barrens and on the sea shore, southern New York to Florida, west to Texas, mostly near the coast. July–Sept.

28. Cyperus ovulàris (Michx.) Torr. Globose Cyperus. (Fig. 570.)

Kyllingia ovularis Michx. Fl. Bor. Am. 1: 29. 1803.
Cyperus ovularis Torr. Ann. Lyc. N. Y. 3: 278. 1836.

Perennial by hard tuber-like corms, stem usually strict, smooth, 8′–2½° tall, longer than the leaves. Leaves smooth, 2″–3″ wide, the longer ones of the involucre much exceeding the umbel; umbel simple, few-rayed, the rays rarely more than 2½′ long; sheath of the rays truncate or slightly toothed; heads globose or sometimes a little longer than thick, 4″–7″ in diameter, very dense, the spikelets radiating in all directions; spikelets 2″–3½″ long, usually 3-flowered, separating from the axis and leaving a scar at maturity; rachis winged; scales ovate or ovate-lanceolate, obtuse or subacute, green, strongly several-nerved; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, 2–3 times as long as thick.

In dry fields and on hills, southern New York to Florida, west to Illinois, Kansas and Texas. July–Sept.

29. Cyperus filicúlmis Vahl. Slender Cyperus. (Fig. 571.)

Cyperus filiculmis Vahl, Enum 2: 328. 1806.

Perennial by hard oblong corms, culm smooth, slender or almost filiform, ascending or reclined, 6′–18′ long, usually longer than the rough-margined leaves. Leaves 1″–2″ wide, keeled, those of the involucre, or some of them, much exceeding the inflorescence; spikelets densely clustered in 1–7 globose heads, linear, acute, 5–11-flowered, subterete or compressed, 2½″–6″ long, 1″ wide or less, tardily falling away from the axis at maturity; rachis wingless; scales ovate, acute or obtuse, pale green, strongly 7–11-nerved, appressed; stamens 3; style 3-cleft; achene oblong or obovoid, 3-angled, obtuse, apiculate, dull gray, two-thirds as long as the scale, about twice as long as thick.

In dry fields and on hills, Rhode Island to Ontario and Minnesota, south to Florida, Kansas, Texas and northern Mexico. June–Aug.

30. Cyperus Hoùghtoni Torr. Houghton's Cyperus. (Fig. 572.)

Cyperus Houghtoni Torr. Ann. Lyc. N. Y. 3: 277. 1836.

Perennial by tuber-like corms, culms very slender, smooth, erect, 1°–2° tall. Leaves shorter than the culm, 1″ wide or less, smooth, those of involucre 3–5, the longer much exceeding the umbel; umbel simple, 1–5-rayed, the rays mostly short, their sheaths 2-toothed; spikelets loosely capitate, linear, compressed, acute, 4″–8″ long, about 1″ wide, 11–15-flowered, falling away from the axis when mature; scales chestnut brown, firm, somewhat spreading, shining, oblong, obtuse, truncate or apiculate, strongly about 11-nerved; rachis very narrowly winged; stamens 3; style 3-cleft; achene broadly oblong, less then twice as long as thick, 3-angled, brown, apiculate, nearly as long as the scale.

In sandy soil, Massachusetts to Minnesota, Kansas and Oregon. July–Aug.

31. Cyperus Gràyi Torr. Gray's Cyperus. (Fig. 573.)

Cyperus Grayi Torr. Ann. Lyc. N. Y. 3: 268. 1836.

Perennial by thick hard oblong or ovoid corms, culms tufted, ascending or reclined, stiff, smooth, very slender, 6′–20′ long. Leaves shorter than the culm, bright green, 1″ wide or less, those of the involucre 4–8, the longer somewhat exceeding the umbel; umbel 4–10-rayed, simple, the longer rays 3′–4′ long; sheaths of the rays truncate or nearly so; spikelets 2½″–5″ long, loosely capitate, compressed, linear, rigid, spreading; scales green, ovate, obtuse or subacute, strongly 13–15-nerved, rather widely spreading when old; joints of the rachis broadly winged; stamens 3; style 3-cleft; achene oblong or oblong-obovoid, obtuse, apiculate, about two-thirds as long as the scale.

In sands of the sea shore and in pine barrens, Massachusetts to Florida. July–Sept.

32. Cyperus echinàtus (Ell.) Wood. Baldwin's Cyperus. (Fig. 574.)

Mariscus echinatus Ell. Bot. S. C. & Ga. 1: 75. *pl. 3. f. 1.* 1816.
Cyperus Baldwinii Torr. Ann. Lyc. N. Y. 3: 270. 1836.
Cyperus echinatus Wood, Class-book, 734. 1863.

Perennial by tuber-like corms, culm slender, smooth, erect, mostly longer than the leaves. Leaves pale green, 1½″–2″ wide, those of the involucre 5–10, the longer usually much exceeding the umbel; umbel simple, 6–13-rayed; the rays filiform, their sheaths short, mucronate; spikelets 2″–3″ long, linear, flat, densely or loosely capitate in globose heads; scales thin, pale green, appressed, ovate-lanceolate, acute, 9–13-nerved, with narrow scarious margins; joints of the rachis broadly winged; stamens 3; style 3-cleft; achene oblong-obovoid, obtuse, one-half as long as the scale, about twice as long as thick.

In dry soil, sometimes a weed in cultivated fields, North Carolina to Florida, west to Missouri and Texas. July–Aug.

2. KÝLLINGA Rottb. Descr. & Ic. 12. *pl. 4. f. 3, 4.* 1773.

Annual or perennial sedges, with slender triangular culms, leafy below, and with 2 or more leaves at the summit forming an involucre to the strictly sessile, simple or compound dense head of spikelets. Spikelets numerous, compressed, falling away from the axis of the head at maturity, consisting of only 3 or 4 scales, the 1 or 2 lower ones small and empty, the middle one fertile, the upper empty or staminate. Joints of the rachis wingless or narrowly winged. Scales 2-ranked, keeled. Perianth none. Stamens 1–3. Style 2–3-cleft, deciduous from the summit of the achene. Achene lenticular or 3-angled. [In honor of Peter Kylling, a Danish botanist of the seventeenth century.]

About 20 species, natives of tropical and temperate regions. Besides the following, 2 others occur in the southern United States.

1. Kyllinga pùmila Michx. Low Kyllinga. (Fig. 575.)

Kyllingia pumila Michx. Fl. Bor. Am. 1: 28. 1803.

Annual, culms densely tufted, filiform, erect or reclined, 2′–15′ long, mostly longer than the leaves. Leaves light green, roughish on the margins, usually less than 1″ wide, those of the involucre 3–5, elongated, spreading or reflexed; head oblong or ovoid-oblong, 3″–4″ long, simple or commonly with 1 or 2 smaller ones at the base; spikelets about 1½″ long, flat, 1-flowered, the 2 empty lower scales more or less persisent on the rachis after the fall of the rest of the spikelet; scales ovate, acuminate or acute, thin, about 7-nerved; stamens 2; style 2-cleft; achene lenticular, obtuse.

In moist or wet soil, Virginia to Florida, west to Illinois, Missouri, Texas and Mexico. Aug.–Sept.

3. DULÍCHIUM L. C. Richard; Pers. Syn. 1: 65. 1805.

A tall perennial sedge, with terete hollow jointed culms, leafy to the top, the lower leaves reduced to sheaths. Spikes axillary, peduncled, simple or compound. Spikelets 2-ranked, flat, linear, falling away from the axis at maturity (?) many-flowered. Scales 2-ranked, carinate, conduplicate, decurrent on the joint below. Flowers perfect. Perianth of 6–9 retrorsely barbed bristles. Stamens 3. Style 2-cleft at the summit, persistent as a beak on the summit of the achene. Achene linear-oblong. [Name said to be from *Dulcichimum*, a Latin name for some sedge.]

A monotypic genus of eastern North America.

1. Dulichium arundinàceum (L.) Britton. Dulichium. (Fig. 576.)

Cyperus arundinaceus L. Sp. Pl. 44. 1753.
Cyperus spathaceus L. Syst. Ed. 12, 2: 735. 1767.
Dulichium spathaceum Pers. Syn. 1: 65. 1805.
Dulichium arundinaceum Britton, Bull. Torr. Club, 21: 29. 1894.

Culm stout, 1°–3° tall, erect. Leaves numerous, flat, 1′–3′ long, 2″–4″ wide, spreading or ascending, the lower sheaths bladeless, brown toward their summits. Spikes shorter than or the uppermost exceeding the leaves; peduncles 2″–12″ long; spikelets narrowly linear, spreading, 6″–12″ long, about 1″ wide, 6–12-flowered; scales lanceolate, acuminate, strongly several-nerved, appressed, brownish; bristles of the perianth rigid, longer than the achene; style long-exserted, persistent.

In wet places, Nova Scotia to Ontario and Minnesota, south to Florida and Texas. Aug.–Oct.

4. ELEÓCHARIS R. Br. Prodr. Fl. Nov. Holl. 1: 224. 1810.

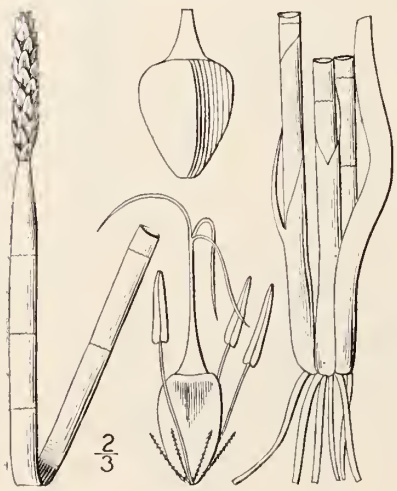
Annual or perennial sedges. Culms simple, triangular, quadrangular, terete, flattened or grooved, the leaves reduced to sheaths or the lowest very rarely blade-bearing. Spikelets solitary, terminal, erect, several–many-flowered, not subtended by an involucre. Scales concave, spirally imbricated all around. Perianth of 1–12 bristles, usually retrorsely barbed, wanting in some species. Stamens 2–3. Style 2-cleft and achene lenticular or biconvex, or 3-cleft and achene 3-angled, but sometimes with very obtuse angles and appearing turgid. Base of the style persistent on the summit of the achene, forming a terminal tubercle. [Greek, referring to the growth of most of the species in marshy ground.]

About 100 species, widely distributed. Besides the following, some 15 others occur in the southern and western parts of North America.

Spikelet scarcely or not at all thicker than the culm.
- Culm stout; spikelet many-flowered.
  - Culm terete, nodose. — 1. *E. interstincta.*
  - Culm quadrangular, continuous. — 2. *E. mutata.*
- Culm slender, triangular, continuous; spikelet few-flowered, subulate. — 3. *E. Robbinsii.*

Spikelet manifestly thicker than the culm.
- Style mostly 2-cleft; achene lenticular or biconvex.
  - Upper sheath scarious, hyaline; plants perennial by slender rootstocks.
    - Scales pale green or nearly white; achene ¼″ long. — 4. *E. ochreata.*
    - Scales dark reddish-brown; achene ½″ long. — 5. *E. olivacea.*
  - Upper sheath truncate, oblique or toothed, not scarious.
    - Annual, with fibrous roots.
      - Achene jet black.
        - Culms 1′–3′ tall; achene ¼″ long; bristles 2–4. — 6. *E. atropurpurea.*
        - Culms 3′–10′ tall; achene ½″ long; bristles 5–8. — 7. *E. capitata.*
      - Achene pale brown.
        - Spikelet ovoid or oblong; tubercle deltoid, acute. — 8. *E. ovata.*
        - Spikelet oblong-cylindric; tubercle broad, low. — 9. *E. Engelmanni.*
    - Perennial by horizontal rootstocks. — 10. *E. palustris.*
- Style 3-cleft; achene 3-angled or turgid.
  - Achene reticulated or cancellate.
    - Spikelet compressed; culm filiform. — 11. *E. acicularis.*
    - Spikelet terete; culm slender.
      - Achene transversely cancellate; bristles none. — 12. *E. Wolfii.*
      - Achene reticulated; bristles present, stout.
        - Tubercle conic, smaller than the achene. — 13. *E. tortilis.*
        - Tubercle cap-like, as large as or larger than the achene. — 14. *E. tuberculosa.*
  - Achene smooth or papillose.
    - Achene smooth, white; culms capillary. — 15. *E. microcarpa.*
    - Achene papillose or smooth, brown, black or yellow.
      - Tubercle depressed or short-conic.
        - Achene smooth.
          - Tubercle flat, covering the top of the black achene. — 16. *E. melanocarpa.*
          - Tubercle ovoid-conic, acute, contracted at the base. — 17. *E. albida.*
        - Achene papillose.
          - Achene 3-ribbed on the angles. — 18. *E. tricostata.*
          - Achene obtuse-angled, not ribbed.
            - Culm filiform; scales obtuse. — 19. *E. tenuis.*
            - Culm flat; scales acute. — 20. *E. acuminata.*
      - Tubercle subulate or narrowly pyramidal.
        - Culms filiform, wiry, densely tufted, 4′–10′ long. — 21. *E. intermedia.*
        - Culms flattened, slender, 1°–2° long. — 22. *E. rostellata.*

1. Eleocharis interstincta (Vahl) R. & S. Knotted Spike-rush. (Fig. 577.)



Scirpus interstinctus Vahl, Enum. 2: 251. 1806.
Scirpus equisetoides Ell. Bot. S. C. & Ga. 1: 79. 1816.
Eleocharis interstincta R. & S. Syst. 2: 148. 1817.
Eleocharis equisetoides Torr. Ann. Lyc. 3: 296. 1836.

Perennial by stout rootstooks, culms terete, hollow, nodose, papillose, 1½°–3° tall, the sterile ones sharp-pointed. Sheaths oblique, membranous, brown or green, the lower sometimes bearing short blades; spikelet terete, cylindric, many-flowered, subacute, 1′–1½′ long, 2″ in diameter, not thicker than the culm; scales ovate, orbicular or obovate, obtuse or the upper acute, narrowly scarious-margined, faintly many-nerved, persistent; bristles about 6, rigid, retrorsely barbed, as long as the body of the achene or shorter; stamens 3; style 3-cleft, exserted; achene obovoid, brown, shining, with minute transverse ridges, convex on one side, very obtusely angled on the other, 2 or 3 times as long as the conic acute black broad-based tubercle.

In water, Massachusetts to Michigan, the West Indies and Mexico. July–Sept.

2. Eleocharis mutàta (L.) R. & S. Quadrangular Spike-rush. (Fig. 578.)

Scirpus mutatus L. Am. Acad. 5: 391. 1760.
Scirpus quadrangulatus Michx. Fl. Bor. Am. 1: 30. 1803.
Eleocharis quadrangulata R. & S. Syst. 2: 155. 1817.
Eleocharis mutata R. & S. Syst. 2: 155. 1817.

Perennial by stout rootstocks, culms sharply 4-angled, stout, not nodose, papillose, 2°–4° tall. Sheaths purplish-brown or green, membranous, sometimes bearing short blades; spikelet terete, acute, cylindric, 1′–2′ long, 2″ in diameter, many-flowered, about as thick as the culm; scales coriaceous, broadly ovate or obovate, obtuse or the upper subacute, scarious-margined and sometimes with a narrow brown band within the margins, faintly many-nerved, persistent; bristles about 6, rigid, retrorsely barbed, about as long as the achene; stamens 3; style 3-cleft; achene obovoid, biconvex or slightly angled on the back, minutely cancellate, about twice as long as the conic acute tubercle, which is truncate or contracted at the base.

In ponds, streams and swamps, northern New Jersey to Michigan, south to Alabama, Missouri, Texas and Guatemala. Also in the West Indies and South America. July–Sept.

3. Eleocharis Robbínsii Oakes. Robbins' Spike-rush. (Fig. 579.)

Eleocharis Robbinsii Oakes, Hovey's Mag. 7: 178. 1841.

Perennial by slender rootstocks, culms slender, 3-angled, continuous, 6′–2° long, sometimes producing numerous filiform flaccid sterile branches from the base. Sheaths appressed, obliquely truncate; spikelet subulate, few-flowered, not thicker than the culm, 6″–10″ long, 1″ in diameter; scales lanceolate or oblong-lanceolate, obtuse or subacute, strongly concave, faintly several-nerved, persistently clasping the rachis, narrowly scarious-margined; style 3-cleft; bristles 6, equalling the achene and tubercle, retrorsely barbed; achene obovoid, light brown, biconvex or very obtusely angled on the back, somewhat longer than the conic-subulate flattened tubercle, which has a raised ring around its base.

In shallow water, New Brunswick to Michigan, south to Florida. Aug.–Sept.

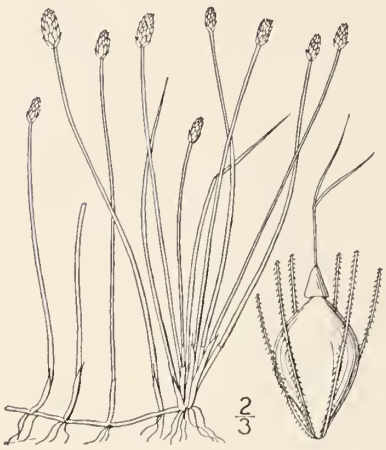
4. Eleocharis ochreàta (Nees) Steud. Pale Spike-rush. (Fig. 580.)

Eleogenus ochreatus Nees in Mart. Fl. Bras. 2: Part 1, 102. 1842.
Eleocharis ochreata Steud. Syn. Pl. Cyp. 79. 1855.

Perennial by very slender rootstocks, culms very slender, or filiform, erect, pale green, 3-angled, 2′–10′ tall. Upper sheath with a white, hyaline, scarious limb; spikelet oblong or ovoid, subacute, 2–3 times as thick as the culm, about 2″ long, 1¼″ in diameter, several-flowered; scales pale green, oblong-lanceolate, obtuse or the upper acute, thin, hyaline with a faint midvein; style 2-cleft; bristles about 6, slender, retrorsely barbed, somewhat longer than the achene; achene ¼″ long, lenticular, obovate, smooth, brown, 2–4 times as long as the conic acute tubercle, which is often constricted at the base.

In wet soil, southern Virginia to Florida and Mississippi. Also in Wyoming and Montana and in tropical America. Aug.–Sept.

5. Eleocharis olivàcea Torr. Bright green Spike-rush. (Fig. 581.)



Eleocharis olivacea Torr. Ann. Lyc. N. Y. 3: 300. 1836.

Perennial by running rootstocks, often tufted and matted, culms very slender, bright green, erect or reclining, flattened, 1′–4′ long. Upper sheath with a white hyaline limb; spikelet ovoid, acute or obtuse, much thicker than the culm, several-many-flowered, about 2″ long, 1″ in diameter; scales ovate, thin, acute, reddish-brown, with a green midvein and narrow, scarious margins; stamens 3; style 2-cleft; bristles 6–8, slender, retrorsely barbed, longer than the achene and tubercle; achene obovoid, similar to that of the preceding species but twice as large, 3–4 times the length of the conic acute tubercle.

In wet soil, Maine to southern Ontario and Pennsylvania, south to South Carolina, mostly near the coast. Aug.–Sept.

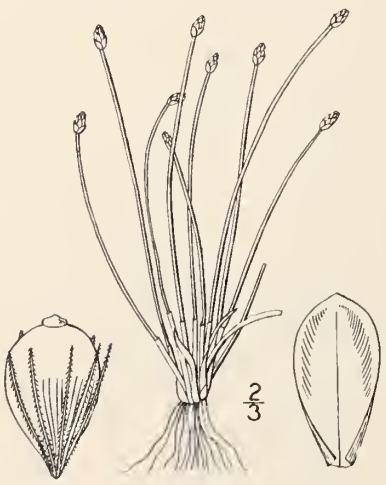
6. Eleocharis atropurpùrea (Retz) Kunth. Purple Spike-rush. (Fig. 582.)

Scirpus atropurpureus Retz, Obs. 5: 14. 1789.
Eleocharis atropurpurea Kunth, Enum. 2: 151. 1837.

Annual, roots fibrous, culms tufted, very slender, 1′–3½′ high. Upper sheath 1-toothed; spikelet ovoid, many-flowered, subacute, 1½″–2″ long, 1″ in diameter or less; scales minute, ovate-oblong, obtuse or the upper acute, persistent, purple-brown with green midvein and very narrow scarious margins; stamens 2 or 3; style 2–3-cleft; bristles 2–4, fragile, white, minutely downwardly hispid, about as long as the achene; achene jet black, shining, ¼″ long, smooth, lenticular; tubercle conic, minute, depressed but rather acute, constricted at the base.

In moist soil, Nebraska and eastern Colorado to Central America, east to Florida; widely distributed in tropical America. July–Sept.

7. Eleocharis capitàta (L.) R. Br. Capitate Spike-rush. (Fig. 583.)



Scirpus capitatus L. Sp. Pl. 48. 1753.
Eleocharis capitata R. Br. Prodr. Fl. Nov. Holl. 1: 225. 1810.

Annual, roots fibrous, culms densely tufted, nearly terete, almost filiform, rather stiff, 2′–10′ tall. Upper sheath 1-toothed; spikelet ovoid, obtuse, much thicker than the culm, 1½″–2½″ long, 1″–1½″ thick, many-flowered; scales broadly ovate, obtuse, firm, pale or dark brown with a greenish midvein, narrowly scarious-margined, persistent; stamens mostly 2; style 2-cleft; bristles 5–8, slender, downwardly hispid, as long as the achene; achene obovate, jet black, smooth, shining, nearly ½″ long; tubercle depressed, apiculate, constricted at the base, very much shorter than the achene.

In moist soil, Maryland to Florida, west to Indiana and Texas. Widely distributed in tropical regions. July–Sept.

8. Eleocharis ovàta (Roth) R. & S. Ovoid Spike-rush. (Fig. 584.)

Scirpus ovatus Roth, Catal. Bot. 1: 5. 1797.
Eleocharis ovata R. & S. Syst. 2: 152. 1817.

Annual, roots fibrous, culms tufted, slender or filiform, rather deep green, nearly terete, mostly erect, 2′–16′ tall. Upper sheath 1-toothed; spikelet ovoid or oblong, obtuse, many-flowered, 2″–5″ long, 1″–1½″ in diameter; scales thin, oblong-orbicular, very obtuse, brown with a green midvein and scarious margins; bristles 6–8 (sometimes fewer or wanting), deciduous, usually longer than the achene; stamens 2 or 3; style 2–3-cleft; achene pale brown, shining, lenticular, obovate-oblong, smooth, ½″ long or more; tubercle deltoid, acute, compressed, scarcely constricted at the base, about one-fourth as long as the achene and narrower.

In wet soil, New Brunswick to Ontario and British Columbia, south to Florida, Oregon, Nebraska and Texas. Also in Europe. Variable. July–Sept.

9. Eleocharis Engelmánni Steud. Engelmann's Spike-rush. (Fig. 585.)

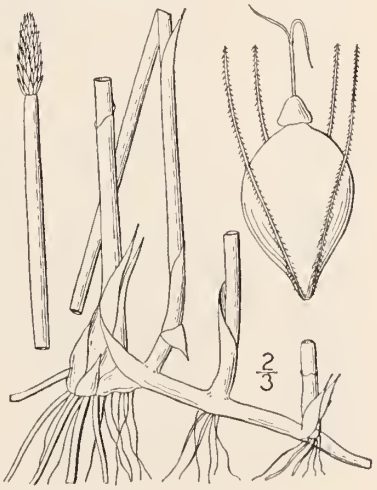
Eleocharis Engelmanni Steud. Syn. Pl. Cyp. 79. 1855.
Eleocharis ovata var. *Engelmanni* Britton, Journ. N. Y. Micros. Soc. 5: 103. 1889.

Annual, similar to the preceding species, but culms commonly taller, sometimes 18′ high. Upper sheath obliquely truncate or 1-toothed; spikelet oblong-cylindric or ovoid-cylindric, obtuse or subacute, 2″–8″ long, 1″–1½″ in diameter, many-flowered; scales pale brown with a green midvein and narrow scarious margins, ovate, obtuse, deciduous; style 2-cleft; bristles about 6, not longer than the achene; achene broadly obovate, brown, smooth, lenticular; tubercle broad, low, covering the top of the achene, less than one-fourth its length.

In wet soil, Massachusetts to southern New Jersey, west to Indiana, Arkansas, Texas and California. July–Sept.

10. Eleocharis palústris (L.) R. & S. Creeping Spike-rush. (Fig. 586.)

Scirpus palustris L. Sp. Pl. 47. 1753.
Eleocharis palustris R. & S. Syst. 2: 151. 1817.
Eleocharis palustris var. *vigens* Bailey; Britton, Journ. N. Y. Micros. Soc. 5: 104. 1889.



Perennial by horizontal rootstocks, culms stout, terete or somewhat compressed, striate, 1°–5° tall. Basal sheaths brown, rarely bearing a short blade, the upper one obliquely truncate; spikelet ovoid-cylindric, 3″–12″ long, 1½″–2″ in diameter, many-flowered, thicker than the culm; scales ovate-oblong or ovate-lanceolate, purplish-brown with scarious margin and a green midvein, or pale green all over; bristles usually 4, slender, retrorsely barbed, longer than the achene and tubercle, sometimes wanting; stamens 2–3; style 2–3-cleft; achene lenticular, smooth, yellow, over ½″ long; tubercle conic-triangular, constricted at the base, flattened, one-fourth to one-half as long as the achene.

In ponds, swamps and marshes, Labrador to British Columbia, south to Florida, Texas and California. Also in Europe and Asia. Aug.–Sept.

Eleocharis palústris glaucéscens (Willd.) A. Gray, Man. Ed. 5, 558. 1867.

Scirpus glaucescens Willd. Enum. 76. 1809.

Culms slender or nearly filiform, 8′–18′ tall; spikelet oblong, 2″–5″ long; achene smaller; tubercle narrower. In wet meadows and marshes, range nearly of the type in North America. Perhaps a distinct species.

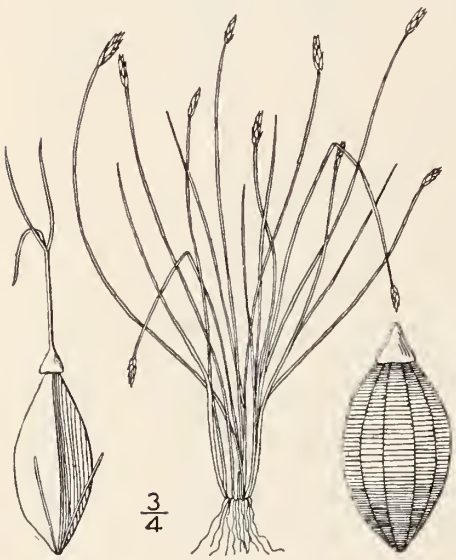
The so-called variety *calva* is a form without bristles.

Eleocharis palústris Wátsoni Clarke, Britten's Journ. Bot. 25: 268. 1887.

Eleocharis Watsoni Bab. Ann. Nat. Hist. (II.) 5: 10. 1852.

Culms stout, 6′–10′ tall; spike ovoid; scales dark purple-brown. Labrador and Prince Edward Island to Hudson Bay.

11. Eleocharis aciculàris (L.) R. & S. Needle Spike-rush. (Fig. 587.)



Scirpus acicularis L. Sp. Pl. 48. 1753.
Eleocharis acicularis R. & S. Syst. 2: 154. 1817.

Perennial by filiform stolons or rootstocks, culms tufted, finely filiform or setaceous, obscurely 4-angled and grooved, weak, erect or reclining, 2′–8′ long. Sheaths truncate; spikelet compressed, narrowly ovate or linear-oblong, acute, broader than the culm, 3–10-flowered, 1½″–3″ long, ½″ wide; scales oblong, obtuse or the upper subacute, thin, pale green, usually with a narrow brown band on each side of the midvein, deciduous, many of them commonly sterile; bristles 3–4, fragile, fugacious, shorter than the achene; stamens 3; style 3-cleft; achene obovoid-oblong, pale, obscurely 3-angled with a rib on each angle and 6–9 lower intermediate ribs connected by fine ridges; tubercle conic, acute, one-fourth as long as the achene.

In wet soil, throughout North America, except the extreme north. Also in Europe and Asia. Sometimes entirely sterile. July–Sept.

12. Eleocharis Wòlfii A. Gray. Wolf's Spike-rush. (Fig. 588.)

Scirpus Wolfii A. Gray, Proc. Am. Acad. 10: 77. 1874.
Eleocharis Wolfii A. Gray; Britton, Journ. N. Y. Micros. Soc. 5: 105. 1889.

Perennial by short rootstocks, culms very slender, erect, flattened and 2-edged, 8′–18′ tall. Upper sheath oblique, scarious, hyaline-tipped; spikelet oblong or ovoid-oblong, terete, acute, thicker than the culm, 2″–3″ long, nearly 1″ in diameter; scales ovate, obtuse or the upper acute, thin, pale green with purplish-brown bands, tardily deciduous; bristles none (or perhaps early deciduous); style 3-cleft; achene obovoid, obscurely 3-angled, longitudinally 9-ribbed, the ribs transversely connected by minute ridges; tubercle depressed-conic, much shorter than the achene.

In wet meadows, Illinois and Iowa. June–Aug.

13. Eleocharis tórtilis (Link) Schultes. Twisted Spike-rush. (Fig. 589.)

Scirpus tortilis Link, Jahrb. 3: 78. 1820.
Eleocharis tortilis Schultes, Mant. 2: 92. 1824.

Annual, roots fibrous, culms tufted, filiform, sharply 3-angled, pale green, erect or reclining, twisting when old, 1°–1½° long. Sheaths obliquely truncate, 1-toothed; spikelet ovoid or oblong, subacute, several-flowered, 2″–3″ long, about 1″ thick, much thicker than the culm; scales firm, pale, ovate, mostly obtuse; bristles 4–6, rigid, retrorsely barbed, about equalling the achene and tubercle; stamens 3; style 3-cleft; achene obovoid, obscurely 3-angled, strongly reticulated, longitudinally about 18-ribbed; tubercle cap-like or conic, truncate at the base, one-fourth to one-half as long as the achene.

In wet soil, Delaware to Florida and Texas, near the coast. July–Sept.

14. Eleocharis tuberculòsa (Michx.) R. & S. Large-tubercled Spike-rush. (Fig. 590.)

Scirpus tuberculosus Michx. Fl. Bor. Am. 1: 30. 1803.
Eleocharis tuberculosa R. & S. Syst. 2: 152. 1817.

Annual, culms tufted, slightly compressed, very slender, rather stiff, striate, bright green, 8′–2° tall. Upper sheath obliquely truncate or 1-toothed; spikelet ovoid, obtuse or subacute, many-flowered, 3″–6″ long, nearly 2″ in diameter; scales broadly ovate, obtuse, pale greenish-brown with a darker midvein, broadly scarious-margined, firm, tardily deciduous; bristles 6, rigid, downwardly or rarely upwardly barbed, about as long as the achene and tubercle; stamens 3; style 3-cleft; achene obovoid, pale, trigonous, strongly reticulated, longitudinally about 18-ribbed; tubercle cap-like or conic, nearly or quite as large as the achene.

In wet soil, Massachusetts to Florida and Texas, near the coast. July–Sept.

15. Eleocharis microcàrpa Torr. Small-fruited Spike-rush. (Fig. 591.)

Eleocharis microcarpa Torr. Ann. Lyc. N. Y. 3: 312. 1836.
Eleocharis Torreyana Boeckl. Linnaea, 36: 440. 1870.

Annual, culms finely filiform, densely tufted, somewhat 4-sided, erect or reclining, often proliferous by developing secondary culms in the axils of the spikelet, sometimes rooting at the summit, 2′–8′ long. Upper sheath obliquely truncate; spikelet oblong, subacute, terete or nearly so, much thicker than the culm, many-flowered, 1½″–2½″ long; scales ovate, acute, brownish-red with a green midvein and lighter margins, early deciduous except the lowest which is commonly larger than the others, persistent and bract-like; bristles 3–6, slender, shorter than or equalling the achene; stamens 3; style 3-cleft; achene white, 3-angled, obovoid, smooth, minute; tubercle conic-pyramidal, much shorter than the achene.

In wet sandy soil, southern New Jersey to Florida and Texas, mostly near the coast. Also in Cuba. June–Aug.

16. Eleocharis melanocàrpa Torr. Black-fruited Spike-rush. (Fig. 592.)

Eleocharis melanocarpa Torr. Ann. Lyc. N. Y. 3: 311. 1836.

Perennial by short rootstocks, culms flattened, striate, tufted, slender, erect, wiry, 10′–20′ tall. Upper sheath truncate, 1-toothed; spikelet oblong or cylindric-oblong, obtuse, 3″–6″ long, 1½″–2″ in diameter, many-flowered, thicker than the culm; scales ovate, obtuse, brown, with a lighter midvein and scarious margins; bristles 3–4, fragile, downwardly hispid, equalling or longer than the achene, fugacious or perhaps sometimes wanting; stamens 3; style 3-cleft; achene 3-angled, obpyramidal, black, smooth, its superficial cells nearly quadrate; tubercle depressed, covering the summit of the achene, light brown, pointed in the middle.

In wet sandy soil, eastern Massachusetts and Rhode Island to Florida, near the coast. Also in northern Indiana. July–Sept.

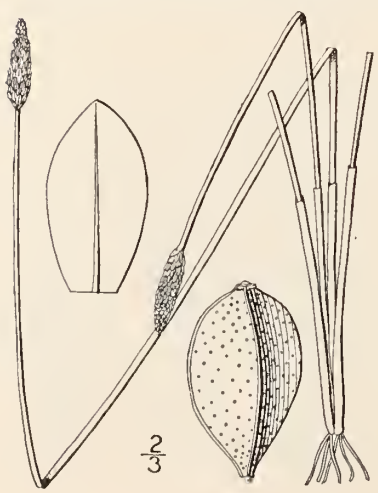
17. Eleocharis álbida Torr. White Spike-rush. (Fig. 593.)

Eleocharis albida Torr. Ann. Lyc. N. Y. 3: 304. 1836.

Annual, roots fibrous, culms very slender, tufted, nearly terete, striate, erect, 4′–8′ tall. Upper sheath very oblique and toothed on one side; spikelet ovoid-globose or oblong, obtuse, 2″–4″ long, 1½″–2″ in diameter, many-flowered, thicker than the culm; scales pale green or nearly white, rather firm, ovate, obtuse, deciduous; bristles about 6, downwardly barbed, persistent, as long as the achene; stamens 3; style 3-cleft; achene broadly obovoid, nearly black when ripe, 3-angled, smooth; tubercle ovoid-conic, contracted or truncate at the base, about one-fourth as long as the achene.

In wet soil, Maryland to Florida, Texas and eastern Mexico, near the coast. June–Aug.

18. Eleocharis tricostàta Torr. Three-ribbed Spike-rush. (Fig. 594.)



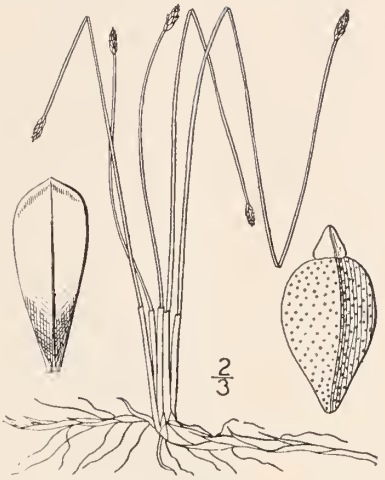
Eleocharis tricostata Torr. Ann. Lyc. N. Y. 3: 310. 1836.

Perennial by short rootstocks, culms very slender, erect, compressed, striate, 1°–2° tall. Upper sheath obliquely truncate, toothed on one side; spikelet oblong, becoming oblong-cylindric, obtuse, many-flowered, 5″–9″ long, 1″–1¼″ in diameter; scales ovate, thin, deciduous, obtuse, brown with a green midvein and scarious margins; bristles none; stamens 3; style 3-cleft; achene obovoid, 3-angled, brown, dull, papillose, strongly ribbed on each of its angles; tubercle conic, acute, light brown, constricted at the base, minute, very much shorter than the achene.

In wet soil, southern New York to Florida. July–Sept.

19. Eleocharis ténuis (Willd.) Schultes. Slender Spike-rush. (Fig. 595.)

Scirpus tenuis Willd. Enum. 1: 76. 1809.
Eleocharis tenuis Schultes, Mant. 2: 92. 1824.



Perennial by rootstocks, culms tufted, filiform, mostly erect, 4-angled with concave sides, 8′–16′ tall. Upper sheath obliquely truncate, toothed on one side; spikelet narrowly oblong, mostly acute, many-flowered, thicker than the culm, 3″–5″ long, about 1″ in diameter; scales thin, obovate or ovate-oblong, obtuse, the midvein greenish, the margins scarious; bristles 2–4, shorter than the achene, fugacious or wanting; achene obovoid, obtusely 3-angled, yellowish-brown, papillose; stamens 3; style 3-cleft; tubercle conic, short, acute.

In wet soil, Cape Breton Island to Ontario and Manitoba, south to Florida and Texas. The achenes are more or less persistent on the rachis of the spikelet after the fall of the scales. May–July.

20. Eleocharis acuminàta (Muhl.) Nees. Flat-stemmed Spike-rush. (Fig. 596.)

Scirpus acuminatus Muhl. Gram. 27. 1817.
Eleocharis compressa Sulliv. Am. Journ. Sci. 42: 50. 1842.
Eleocharis acuminata Nees, Linnaea, 9: 294. 1835.

Perennial by stout rootstocks, similar to the preceding species but stouter, culms flattened, striate, slender but rather stiff, tufted, 8′–2° tall. Upper sheath truncate, sometimes slightly 1-toothed; spikelet ovoid or oblong, obtuse, thicker than the culm, many-flowered, 3″–6″ long; scales oblong or ovate-lanceolate, acute or the lower obtusish, purple-brown with a greenish midvein and hyaline white margins, deciduous; bristles 1–5, shorter than or equalling the achene, fugacious, or wanting; stamens 3; style 3-cleft, exserted; achene obovoid, very obtusely 3-angled, light yellowish brown, papillose, much longer than the depressed-conic acute tubercle.

In wet soil, Anticosti to Manitoba, south to Georgia, Louisiana and Missouri. Achenes persistent on the rachis as in *E. tenuis*. June–Aug.

21. Eleocharis intermèdia (Muhl.) Schultes. Matted Spike-rush. (Fig. 597.)

Scirpus intermedius Muhl. Gram. 31. 1817.
Eleocharis intermedia Schultes, Mant. 2: 91. 1824.

Annual, roots fibrous, culms filiform, densely tufted, diffusely reclining or ascending, usually matted, grooved, 4′–12′ long. Upper sheath obliquely truncate, toothed on one side; spikelet ovoid-oblong, acute, 8–20-flowered, thicker than the culm; scales oblong-lanceolate, obtuse or the upper subacute, light purple-brown with a green midvein, tardily deciduous or the lower one persistent; bristles persistent, downwardly barbed, longer than the achene and tubercle; stamens 3; style 3-cleft; achene 3-angled, obovoid, light brown, finely reticulated; tubercle conic-subulate, very acute, slightly constricted at the base, one-fourth to one-half as long as the achene.

In marshes, Ontario to Minnesota, south to New Jersey, Ohio, Illinois and Iowa. July–Sept.

22. Eleocharis rostellàta Torr. Beaked Spike-rush. (Fig. 598.)

Scirpus rostellatus Torr. Ann. Lyc. N. Y. 3: 318. 1836.
Eleocharis rostellata Torr. Fl. N. Y. 2: 347. 1843.

Perennial by a short caudex, culms slender, wiry, the fertile erect or ascending, the sterile reclining and rooting at the summit, grooved, 1°–5° long. Upper sheath truncate; spikelet oblong, narrowed at both ends, thicker than the culm, 10–20-flowered, 3″–6″ long, about 1″ in diameter; scales ovate, obtuse or the upper acute, green with a somewhat darker midvein, their margins slightly scarious; bristles 4–8, retrorsely barbed, longer than the achene and tubercle; stamens 3; style 3-cleft; achene oblong-obovoid, obtusely 3-angled, its surface finely reticulated; tubercle conic-subulate, about one-half as long as the achene or shorter, capping its summit, partly or entirely falling away at maturity.

In marshes and wet meadows, Vermont and western New York to British Columbia, south to Florida, Texas, Mexico and California. Also in Cuba. Aug.–Sept.

5. DICHRÓMENA Michx. Fl. Bor. Am. 1: 37. 1803.

Leafy-stemmed sedges, perennial by rootstocks, the spikelets crowded in a terminal head involucrate by the upper leaves, which are often white at the base. Spikelets compressed, several-many-flowered. Scales spirally imbricated all around, several of them with imperfect flowers, or empty. Perianth none. Stamens 3. Style 2-cleft, its branches subulate. Achene lenticular, transversely rugose, crowned with the broad persistent base of the style (tubercle). [Greek, alluding to the two-colored involucral leaves.]

About 8 species, natives of America. Besides the following, another occurs in the southwestern United States.

Leaves of the involucre linear; tubercle truncate at the base. 1. *D. colorata.*
Leaves of the involucre lanceolate, long-acuminate; tubercle decurrent on the edges of the achene. 2. *D. latifolia.*

1. Dichromena coloràta (L.) A. S. Hitchcock. Narrow-leaved Dichromena. (Fig. 599.)

Schoenus coloratus L. Sp. Pl. 43. 1753.
Dichromena leucocephala Michx. Fl. Bor. Am. 1: 37. 1803.
Dichromena colorata A. S. Hitchc. Ann. Rep. Mo. Bot. Gard. 4: 141. 1893.

Glabrous, culm slender, erect, rather sharply triangular, 1°–2° tall. Leaves distant, narrowly linear, about 1″ wide, much shorter than the culm, those of the involucre 4–6, reflexed when mature, yellowish white at the base; head globose, 6″–10″ in diameter; spikelets narrowly oblong, acute; scales membranous, lanceolate, nearly white, 1-nerved, subacute at the apex; achene obovate, brown, papillose or wrinkled transversely, nearly truncate at the summit, compressed, covered by the tubercle which is not decurrent on its edges.

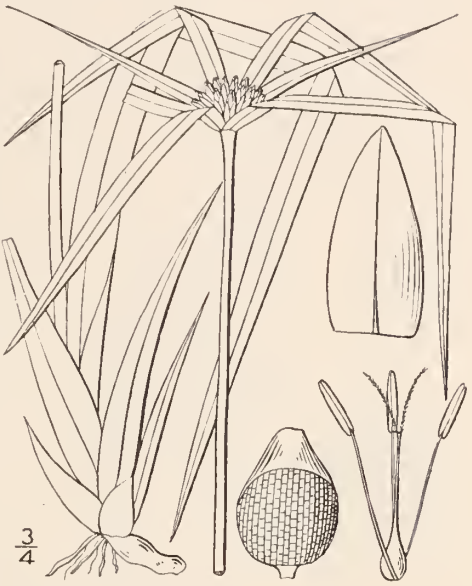
In moist sandy soil, pine-barrens of New Jersey to Florida and Texas. Also in tropical America. June–Sept.

2. Dichromena latifòlia Baldw. Broad-leaved Dichromena. (Fig. 600.)

Dichromena latifolia Baldw.; Ell. Bot. S. C. & Ga. 1: 90. 1816.

Similar to the preceding species but the culm stouter, obtusely triangular or nearly terete, the leaves lanceolate or linear-lanceolate, tapering gradually to a long-acuminate apex from a broad base, 1½″–4″ wide, sometimes overtopping the culm, but the lowest much shorter, those of the involucre 7–10, strongly reflexed when old. Head globose, 6″–9″ in diameter; spikelets oblong, subacute; scales ovate-lanceolate, nearly white, rather obtuse; achene nearly orbicular in outline, pale brown, faintly wrinkled transversely and longitudinally, so as to appear reticulated; tubercle decurrent on the margins of the achene.

In wet pine barrens, Virginia to Florida and Texas. June–Aug.



6. PSILOCÀRYA Torr. Ann. Lyc. N. Y. 3: 359. 1836.

Annual sedges, with fibrous roots, slender leafy stems and ovoid or oblong, many-flowered terete spikelets in terminal and axillary, mostly compound umbels, the rays and raylets bracted at the base. Scales of the spikelets spirally imbricated all around, all fertile, deciduous. Flowers perfect. Perianth none. Stamens 1 or 2. Style 2-cleft, enlarged at the base. Achene lenticular or biconvex, smooth or transversely wrinkled, capped by the persistent base of the style (tubercle), or nearly the whole style persistent as a beak. [Greek, referring to the absence of perianth-bristles.]

About 10 species, natives of temperate and tropical America. Besides the following, another occurs in the southeastern United States.

Achene strongly wrinkled, much longer than the subacute tubercle. 1. *P. nitens*
Achene smooth or but little wrinkled; tubercle subulate. 2. *P. scirpoides.*

1. Psilocarya nìtens (Vahl) Wood. Short-beaked Bald-rush. (Fig. 601.)

Scirpus nitens Vahl, Enum. 2: 272. 1806.

Psilocarya rhynchosporoides Torr. Ann. Lyc. N. Y. 3: 361. 1836.

Rhynchospora nitens A. Gray, Man. Ed. 5, 568. 1867.

Psilocarya nitens Wood, Bot. & Fl. 364. 1870.

Glabrous, culms tufted, slightly angled, 3′–15′ tall. Leaves narrowly linear, about 1″ wide, smooth, sometimes overtopping the culm, sheathing at the base, the midvein prominent; umbels mostly loose; spikelets ovoid, 2″–3″ long, rather less than 1″ in diameter; scales brown, broadly ovate, thin, 1-nerved, obtuse, acute or apiculate; achene lenticular, nearly orbicular, light brown, strongly wrinkled transversely; tubercle shorter than the achene, subacute, 2-lobed at the base.

In wet soil, Long Island, N. Y., and Delaware to Florida and Texas, near the coast. July–Oct.

2. Psilocarya scirpoides Torr. Long-beaked Bald-rush. (Fig. 602.)

Psilocarya scirpoides Torr. Ann. Lyc. N. Y. 3: 360. 1836.

Rhynchospora scirpoides A. Gray, Man. Ed. 5, 568. 1867.

Similar to the preceding species and perhaps not specifically distinct. Umbels commonly more numerous; spikelets oblong or ovoid-oblong; achene nearly orbicular in outline, biconvex, not as flat as that of *P. nitens*, dark brown, faintly transversely wrinkled or smooth, sometimes longitudinally striate, slightly contracted at the base into a short stipe; tubercle subulate, as long as or sometimes longer than the achene, its base decurrent on the edges.

In wet soil, eastern Massachusetts and Rhode Island. July-Sept.

7. STENOPHÝLLUS Raf. Neog. 4. 1825.

Mostly annual sedges, with slender erect culms, leafy below, the leaves narrowly linear or filiform, with ciliate or pubescent sheaths. Spikelets umbellate, capitate or solitary, subtended by a 1–several-leaved involucre, their scales spirally imbricated all around, mostly deciduous. Flowers perfect. Perianth none. Stamens 2 or 3. Style 2–3-cleft, glabrous, its base much swollen and persistent as a tubercle on the achene as in *Eleocharis*. Achene 3-angled, turgid or lenticular. [Greek, referring to the narrow leaves.]

A genus of some 20 species, natives of temperate and warm regions. Besides the following, 5 others occur in the southern United States.

1. Stenophyllus capillàris (L.) Britton. Hair-like Stenophyllus. (Fig. 603.)

Scirpus capillaris L. Sp. Pl. 49. 1753.

Fimbristylis capillaris A. Gray, Man. 530. 1848.

Stenophyllus capillaris Britton, Bull. Torr. Club, 21: 30. 1894.

Annual, roots fibrous, culms filiform, densely tufted, erect, grooved, smooth, 2′–10′ tall. Leaves filiform, roughish, much shorter than the culm, their sheaths more or less pubescent with long hairs; involucral leaves 1–3, setaceous, shorter than, or one of them exceeding the inflorescence; spikelets narrowly oblong, somewhat 4-sided, 2½″–4″ long, less than 1″ thick, several in a terminal simple or sometimes compound umbel, or in depauperate forms solitary; scales oblong, obtuse or emarginate, puberulent, dark brown with a green keel; stamens 2; style 3-cleft; achene yellow-brown, narrowed at the base, very obtuse or truncate at the summit, ¼″ long, 3-angled, transversely wrinkled; tubercle minute, depressed.

In dry or moist soil, throughout North America except the extreme north. Also in tropical America. July-Sept.

8. FIMBRÍSTYLIS Vahl, Enum. 2: 285. 1806.

Annual or perennial sedges. Culms leafy below. Spikelets umbellate or capitate, terete, several to many-flowered, subtended by a 1–many-leaved involucre, their scales spirally imbricated all around, mostly deciduous, all fertile. Perianth none. Stamens 1–3. Style 2–3-cleft, pubescent or glabrous, its base much enlarged, falling away from the summit of the achene at maturity. Achene lenticular, biconvex, or 3-angled, reticulated, cancellate, or longitudinally ribbed or striate in our species. [Greek, in allusion to the fringed style of some species.]

A large genus, the species widely distributed in temperate and tropical regions. Besides the following, some 4 others occur in the southern and western parts of North America.

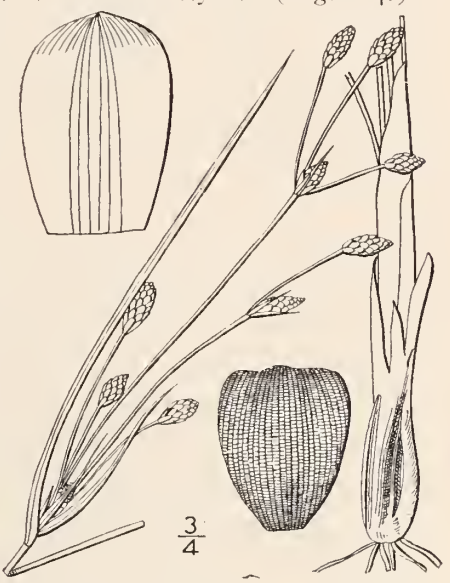
Style 2-cleft; achene lenticular or biconvex.
Culms 8′–3° tall; spikelets umbellate; style mostly pubescent.
Perennial; leaves involute.
Scales coriaceous, shining, glabrous. 1. *F. spadicea.*
Scales membranous, dull, puberulent. 2. *F. castanea.*
Annual; roots fibrous; leaves flat. 3. *F. laxa.*
Culms 1′–4′ tall, very slender; spikelets capitate; style glabrous below. 4. *F. Vahlii.*
Style 3-cleft; achene 3-angled. 5. *F. autumnalis.*

1. Fimbristylis spadícea (L.) Vahl. Stiff Fimbristylis. (Fig. 604.)

Scirpus spadiceus L. Sp. Pl. 51. 1753.
Fimbristylis spadicea Vahl, Enum. 2: 294. 1806.

Perennial by a thickened base, glabrous, culms stiff, slender, 3-angled, wiry, 1°–3° tall, usually longer than the strongly involute rigid leaves. Leaves about 1″ wide when unrolled, their sheaths dark brown; leaves of the involucre 3–6, erect, the longer sometimes exceeding the usually compound umbel; umbel several-rayed, the rays nearly erect, 2′–6′ long; central spikelets of the umbels and umbellets sessile, the others pedicelled; spikelets ovoid or ovoid-cylindric, acute, 2½″–6″ long, about 1″ in diameter; scales oval, obovate, or orbicular, obtuse or subacute, coriaceous, glabrous, shining, dark brown with a green midvein; stamens 2; style 2-cleft; achene lenticular, obovate, brown, reticulated.

In marshes and shallow water, Virginia to Florida, near the coast. Widely distributed in tropical America. July–Sept.



2. Fimbristylis castànea (Michx.) Vahl. Marsh Fimbristylis. (Fig. 605.)

Scirpus castaneus Michx. Fl. Bor. Am. 1: 31. 1803.
Fimbristylis castanea Vahl, Enum. 2: 292. 1806.
Fimbristylis spadicea var. *castanea* A. Gray, Man. Ed. 5, 566. 1867.

Perennial by a thick base, culms slender, 3-angled, 8′–2° tall, usually exceeding the leaves. Leaves involute, less than 1″ wide when unrolled, their sheaths green and more or less pubescent; leaves of the involucre 2–4, short; umbel simple or compound, the rays ½′–2′ long; central spikelets sessile; spikelets oblong, obtuse or subacute, 3″–5″ long, 1″–1½″ in diameter; scales thin, brown with a lighter midvein, broadly oblong or nearly orbicular, dull, puberulent, obtuse or mucronate; stamens 2–3; style 2-cleft; achene obovate or oblong, biconvex, pale brown, longitudinally striate and reticulated.

On salt meadows, southern New York to Florida and Louisiana. Also in wet soil in the interior from Michigan and Illinois to Kansas and Texas, and in tropical America. July–Sept.

3. Fimbristylis láxa Vahl. Weak Fimbristylis. (Fig. 606.)

Fimbristylis laxa Vahl, Enum. 2: 292. 1806.
Fimbristylis Baldwiniana Torr. Ann. Lyc. N. Y. 3: 344. 1836.

Annual, roots fibrous, culms slender, flattened, striate, densely tufted, erect or ascending, 2′–15′ long, usually longer than the leaves. Leaves flat, about ½″ wide, glabrous or sparingly ciliate, pale green and appearing glaucous, those of the involucre 3–5, one of them often exceeding the umbel; umbel simple or slightly compound, the central spikelet sessile; spikelets ovoid or ovoid-oblong, 3″–6″ long, about 1″ in diameter; scales ovate, thin, pale greenish-brown, subacute or mucronulate; stamen 1; style 2-cleft, pubescent; achene biconvex, obovoid, light brown, longitudinally ribbed, the ribs tubercled and connected by very fine cross-lines.

In moist soil, southern Pennsylvania to Florida, west to Illinois, Missouri and Texas. Also in tropical America. July–Sept.

4. Fimbristylis Vàhlii (Lam.) Link. Vahl's Fimbristylis. (Fig. 607.)

Scirpus Vahlii Lam. Tabl. Encycl. 1: 139. 1791.
Fimbristylis Vahlii Link, Hort. Berol. 1: 287. 1827.
Fimbristylis congesta Torr. Ann. Lyc. N. Y. 3: 345. 1836.

Annual, culms very slender, densely tufted, compressed, striate, erect or ascending, 1′–4′ high, longer than or equalling the leaves. Leaves setaceous or almost filiform, rough, those of the involucre 3–5, erect, much exceeding the simple capitate cluster of 3–8 spikelets; spikelets oblong-cylindric, obtuse, 2″–4″ long, about ½″ thick, many-flowered; scales lanceolate, pale greenish-brown, acuminate; stamen 1; style 2-cleft, glabrous below; achene minute, biconvex, yellowish-white, cancellate by longitudinal and transverse ridges.

In moist soil, Missouri to Texas, east to North Carolina and Florida. Also in ballast about the eastern seaports. July–Oct.

5. Fimbristylis autumnàlis (L.) R. & S. Slender Fimbristylis. (Fig. 608.)

Scirpus autumnalis L. Mant. 2: 180. 1771.
Fimbristylis autumnalis R. & S. Syst. 2: 97. 1817.

Annual, roots fibrous, culms very slender, densely tufted, flat, roughish on the edges or smooth, erect, ascending or spreading, 3′–15′ long, usually much exceeding the leaves. Leaves narrowly linear, flat, ½″–1″ wide, long-acuminate, glabrous, those of the involucre 2–3, usually all shorter than the umbel; umbel compound or decompound, the primary rays ¼′–1½′ long, the secondary filiform; spikelets linear-oblong, acute, 2″–5″ long, ½″ thick or less, several–many flowered; scales ovate-lanceolate, subacute, strongly mucronate, greenish-brown, the midvein prominent; stamens 1–3; style 3-cleft; achene obovoid, nearly white, 3-angled with a ridge on each angle, very finely reticulated and sometimes roughened.

In moist soil, Maine to Michigan, south to Florida and Louisiana. Also in tropical America. June–Sept.

9. SCIRPUS L. Sp. Pl. 47. 1753.

Annual or perennial very small or very large sedges, with leafy culms or the leaves reduced to basal sheaths. Spikelets terete or somewhat flattened, solitary, capitate, spicate or umbellate, subtended by a 1–several-leaved involucre or the involucre wanting in some species. Scales spirally imbricated all around, usually all fertile, the 1–3 lower sometimes empty. Flowers perfect. Perianth of 1–6, slender or rigid, short or elongated, barbed, pubescent or smooth bristles, or none in some species. Stamens 2–3. Style 2–3-cleft, not swollen at the base, wholly deciduous from the achene, or its base persistent as a subulate tip. Achene triangular, lenticular or plano-convex. [Latin name of the Bulrush, said to be from *sirs*, the Celtic word for rushes.]

About 200 species of very wide geographic distribution. Besides the following, some 6 others occur in the southern and western parts of North America.

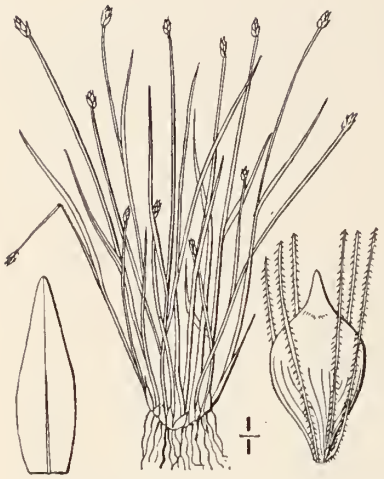
Spikelet solitary, terminal, bractless or subtended by a single bract or short leaf.
- No involucral bract.
  - Culms 1′–2′ high; achene smooth; plant of saline soil. 1. *S. nanus.*
  - Culms 3′–10′ high; achene reticulated; plant of fresh-water marshes. 2. *S. pauciflorus.*
- Involucral bract present, erect.
  - Bract shorter than or but little exceeding the spikelet; plants not aquatic.
    - Culm terete; leaf of upper sheath subulate; bristles smooth. 3. *S. caespitosus.*
    - Culms triangular; leaf of upper sheath linear; bristles upwardly barbed.
      - Leaves shorter than the culm; scales acute. 4. *S. Clintoni.*
      - Leaves about as long as the culm; scales cuspidate. 5. *S. planifolius.*
  - Bract at least twice as long as the spikelet; plant aquatic. 6. *S. subterminalis.*

Spikelets normally more than 1, usually several or numerous, often appearing lateral; involucral bract only 1.
- Spikelets few, 1–12, appearing lateral.
  - Culms not sharply 3-angled; achene plano-convex; annuals.
    - Achene strongly transversely rugose. 7. *S. Hallii.*
    - Achene smooth or very slightly roughened.
      - Bristles downwardly barbed, about equalling the achene. 8. *S. debilis.*
      - Bristles minute or wanting. 9. *S. Smithii.*
  - Culms sharply 3-angled; plants perennial by rootstocks.
    - Achene plano-convex; bristles shorter than or equalling the achene.
      - Spikelets acute, much overtopped by the slender involucral leaf; scales awned. 10. *S. Americanus.*
      - Spikelets obtuse; involucral leaf short, stout; scales mucronulate. 11. *S. Olneyi.*
    - Achene 3-angled, ridged on the back.
      - Bristles longer than the achene; involucral leaf erect. 12. *S. Torreyi.*
      - Bristles as long as the achene; involucral leaf abruptly bent. 13. *S. mucronatus.*
- Spikelets several or numerous, umbelled; tall sedges.
  - Culm sharply triangular, equalled by the long leaves. 14. *S. cylindricus.*
  - Culm terete; leaves reduced to sheaths.
    - Bristles downwardly barbed; achene gray, abruptly mucronate. 15. *S. lacustris.*
    - Bristles short-plumose below; achene nearly white, narrowed above. 16. *S. Californicus.*
- Spikelets several, spicate. 17. *S. rufus.*

Spikelets several, capitate or umbellate, large; involucral leaves 2 or more.
- Achene lenticular or plano-convex; spikelets capitate.
  - Capitate cluster simple; achene obovate-oblong, pale brown. 18. *S. campestris.*
  - Capitate cluster often compound; achene orbicular-obovate, dark brown. 19. *S. robustus.*
- Achene sharply 3-angled; spikelets umbellate. 20. *S. fluviatilis.*

Spikelets very numerous in compound umbels or umbelled heads, small; involucral leaves several; tall sedges.
- Bristles downwardly barbed; spikelets in umbelled heads.
  - Spikelets ovoid or oblong, 1½″–2½″ long.
    - Bristles equalling or slightly exceeding the achene; leaves 3″–8″ wide.
      - Style 3-cleft; achene 3-angled; bristles 6.
        - Spikelets 3–8 in each head; bristles barbed throughout; scales obtuse. 21. *S. sylvaticus.*
        - Spikelets 8–20 in each head; bristles not barbed below; scales acute. 22. *S. atrovirens.*
      - Style 2-cleft; achene plano-convex; bristles 4. 23. *S. microcarpus.*
    - Bristles flexuous, twice as long as the achene; leaves 2″–3″ wide. 24. *S. polyphyllus.*
  - Spikelets cylindric, 3″–5″ long. 25. *S. Peckii.*
- Bristles smooth or slightly pubescent; umbel mostly decompound.
  - Bristles shorter than or scarcely exceeding the scales.
    - Bristles about as long as the achene; scales subacute. 26. *S. divaricatus.*
    - Bristles much longer than the achene; scales mucronate. 27. *S. lineatus.*
  - Bristles much exserted beyond the scales when mature. 28. *S. cyperinus.*

1. Scirpus nànus Spreng. Dwarf Club-rush. (Fig. 609.)



Scirpus nanus Spreng. Pug. 1: 4. 1815.
Eleocharis pygmaea Torr. Ann. Lyc. N. Y. 3: 313. 1836.

Annual, roots fibrous, culms filiform, flattened, grooved, tufted, erect or ascending, 1′–2′ high, bearing a scarious bladeless sheath near the base. Spikelet solitary, terminal, ovoid-oblong, rather acute, 3–8-flowered, 1″–1½″ long, not subtended by a bract; scales ovate or lanceolate, pale green, the lower obtuse, the upper subacute; bristles about 6, downwardly barbed, longer than the achene; stamens 3; style 3-cleft; achene oblong, 3-angled, pale, pointed at each end, smooth.

Muddy places in salt marshes, Cape Breton Island to Florida and Texas, and about salt springs in New York and Michigan. Also on the Pacific Coast of North America and on the coasts of Europe. July–Sept.

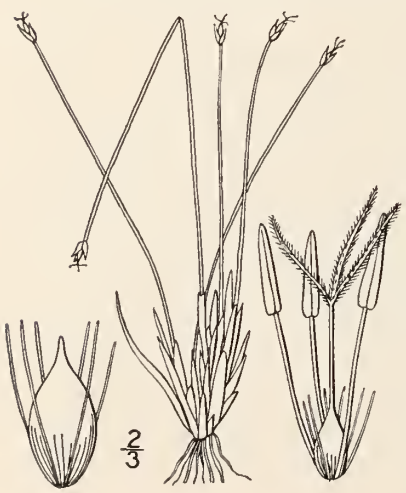
2. Scirpus pauciflòrus Lightf. Few-flowered Club-rush. (Fig. 610.)

Scirpus pauciflorus Lightf. Fl. Scot. 1078. 1777.
Eleocharis pauciflorus Link, Hort. Berol. 1: 284. 1827.

Perennial by filiform rootstocks, culms very slender, little tufted, 3-angled, grooved, leafless, 3′–10′ tall, the upper sheath truncate. Spikelet terminal, solitary, not subtended by an involucral bract, oblong, compressed, 4–10-flowered, 2″–3″ long, nearly 1″ wide; scales brown with lighter margins and midvein, lanceolate, acuminate; bristles 2–6, hispid, as long as the achene or longer; stamens 3; style 3-cleft; achene obovoid-oblong, gray, rather abruptly beaked, its surface finely reticulated.

In wet soil, Anticosti and Ontario to western New York, Minnesota and British Columbia, south in the Rocky Mountains to Colorado, and in the Sierra Nevada. Also in northern Europe. July–Oct.

3. Scirpus caespitòsus L. Tufted Club-rush. (Fig. 611.)



Scirpus caespitosus L. Sp. Pl. 48. 1753.

Perennial, culms smooth, terete, densely tufted, light green, erect or ascending, almost filiform, wiry, 4′–15′ long. Basal sheaths numerous, membranous, imbricated, acuminate, the upper one bearing a short very narrow blade; spikelet solitary, terminal, few-flowered, ovoid-oblong, about 2″ long, subtended by a subulate involucral leaf of about its own length; scales yellowish-brown, ovate, obtuse or subacute, deciduous; bristles 6, smooth, longer than the achene; stamens 3; style 3-cleft; achene oblong, smooth, 3-angled, brown, acute.

In bogs and on moist rocks, Greenland to Alaska, south to the mountains of New England, the Adirondacks, western New York, Illinois, Minnesota and British Columbia, in the Rocky Mountains to Colorado, and on the higher summits of the southern Alleghenies. Also in Europe and Asia. June–Aug.

4. Scirpus Clíntoni A. Gray. Clinton's Club-rush. (Fig. 612.)

Scirpus Clintoni A. Gray, Am. Journ. Sci. (II.) 38: 290. 1864.

Perennial, culms tufted, triangular, very slender, erect, 4′–15′ tall, roughish on the angles. Lower sheaths imbricated, one or more of them bearing short subulate blades, the upper one bearing a flat, narrowly linear blade shorter than the culm; spikelet solitary, terminal, ovoid, few-flowered, 1½″–2″ long, subtended by a subulate involucral bract of less than its own length or somewhat longer; scales ovate, pale brown, acute; bristles 3–6, filiform, upwardly barbed, as long as the achene or longer; style 3-cleft; achene oblong, brown, sharply 3-angled, smooth, obtuse.

In dry fields and thickets, New Brunswick to western New York and Michigan, south to North Carolina. Local. June–Aug.

5. Scirpus planifòlius Muhl. Wood Club-rush. (Fig. 613.)

Scirpus planifolius Muhl. Gram. 32. 1817.

Perennial, culms triangular, slender, tufted, rather weak, roughish on the angles, 6′–15′ tall. Lower sheaths bearing short subulate blades, the upper with a flat narrowly linear rough-margined leaf about as long as the culm; spikelet solitary, terminal, ovoid-oblong, acute, several-flowered, subtended by a short involucral bract; scales ovate-lanceolate, yellowish-brown with a green midvein, which is extended beyond the acute apex into a sharp cusp; bristles 4–6, upwardly barbed, about equalling the achene; stamens 3; style 3-cleft, pubescent; achene oblong, 3-angled; smooth, light brown, rather obtuse.

In woods and thickets, Rhode Island to Delaware, western New York and Missouri. May–July.

6. Scirpus subterminàlis Torr. Water Club-rush. (Fig. 614.)

Scirpus subterminalis Torr. Fl. U. S. 1: 47. 1824.

Perennial (?), aquatic, culms slender, terete, nodulose, 1°–3½° long. Leaves slender, channeled, 6′–2° long, ¼″–¾″ wide; spikelet solitary, terminal, oblong-cylindric, narrowed at each end, several-flowered, 3″–5″ long, subtended by a subulate erect involucral leaf ½′–1′ long, thus appearing lateral; scales ovate-lanceolate, acute, membranous, light brown with a green midvein; bristles about 6, downwardly barbed, as long as the achene or shorter; stamens 3; style 3-cleft to about the middle; achene obovoid, 3-angled, dark brown, smooth, rather more than 1″ long, obtuse, abruptly beaked by the slender base of the style.

In ponds and streams or sometimes on their borders, New Brunswick to the Northwest Territory and Washington, south to New Jersey, Pennsylvania and Michigan. The so-called variety *terrestris* is an emersed form with erect culms and shorter spikelets. July–Aug.

7. Scirpus Hàllii A. Gray. Hall's Club-rush. (Fig. 615.)

Scirpus Hallii A. Gray, Man. Ed. 2, Add. 1863.
Scirpus supinus var. *Hallii* A. Gray, Man. Ed. 5, 563. 1867.

Annual, culms very slender, smooth, tufted, obtusely triangular, erect, striate, 5′–12′ tall. Lower sheaths oblique, and acuminate or mucronate on one side, the upper one commonly bearing a filiform blade ½′–2½′ long; spikelets capitate in clusters of 1–7, oblong-cylindric, obtuse, many-flowered, 3″–6″ long, about 1″ thick, appearing lateral by the extension of the solitary involucral leaf which is 1′–4′ long; scales ovate-lanceolate, light greenish brown, acuminate, keeled, cuspidate by the excurrent tip of the midvein; bristles wanting; stamens mostly 2; achene obovate-orbicular or slightly broader than high, black, plano-convex, mucronulate strongly wrinkled transversely, about ½″ in diameter.

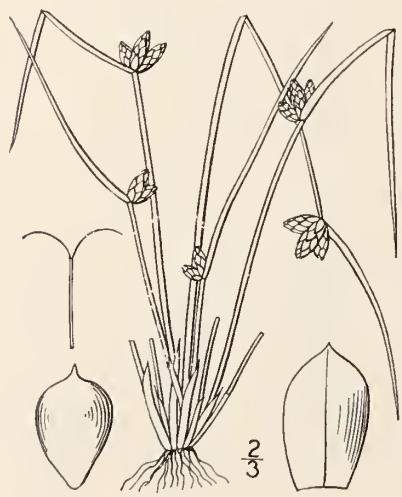
In wet soil, Massachusetts to Florida, west to Illinois, Colorado, Texas and Mexico. The lowest sheaths occasionally subtend a flower with very long styles. July–Sept.

8. Scirpus débilis Pursh. Weak-stalked Club-rush. (Fig. 616.)

Scirpus debilis Pursh, Fl. Am. Sept. 55. 1814.

Annual, smooth, culms slender, terete or nearly so, tufted, erect or ascending, 6′–2° high. Sheaths obliquely truncate, the upper one rarely bearing a short subulate blade; spikelets capitate in clusters of 1–12, ovoid-oblong, subacute, many-flowered, appearing lateral, the solitary involucral leaf narrowly linear, 1½′–4′ long, erect or divergent; scales light yellowish-brown with a green midvein, broadly ovate, obtuse or acute; bristles 4–6, downwardly barbed, somewhat unequal and about as long as the achene; stamens 2–3; style 2-cleft or rarely 3-cleft; achene plano-convex, broadly obovate or orbicular, smooth or slightly roughened, dark brown, shining, obtuse, mucronulate.

In wet soil, Maine to Minnesota, south to Georgia, Alabama and Nebraska. July–Sept.



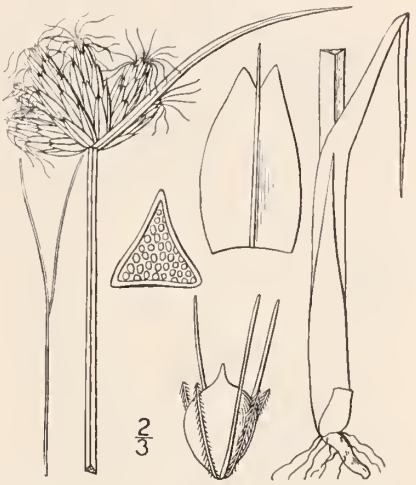
9. Scirpus Smíthii A. Gray. Smith's Club-rush. (Fig. 617.)

Scirpus Smithii A. Gray, Man. Ed. 5, 563. 1867.

Annual, similar to the preceding species, but the culms usually lower and more slender or nearly filiform, 3′–12′ tall, the sheaths oblique and acuminate or the upper one bearing a subulate blade. Spikelets 1–4, in an apparently lateral cluster, ovoid, acute, 2″–3″ long, the involucral leaf very narrow, elongated, erect; scales oblong, obtuse, mucronulate, pale brown with a narrow, green midvein; bristles usually wanting, sometimes 1–3, and very much shorter than the achene; style 2-cleft; achene plano-convex, obovate or orbicular, brown, rather dull, smooth or minutely roughened, obtuse, mucronulate.

In wet muddy places, Vermont to Minnesota, south to Delaware, Pennsylvania and Michigan. Perhaps only a form of the preceding. July–Sept.

10. Scirpus Americànus Pers. Three-square. Chair-maker's Rush. (Fig. 618.)



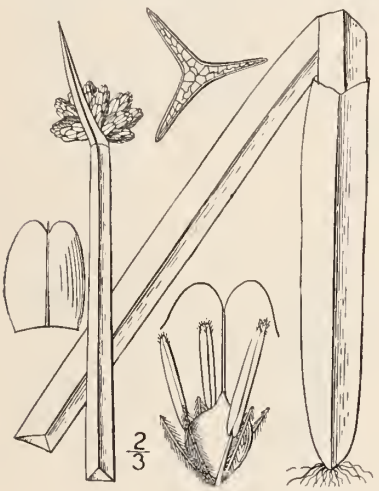
Scirpus Americanus Pers. Syn. 1: 68. 1805.
Scirpus pungens Vahl, Enum, 2: 255. 1806.

Perennial by long rootstocks, culms sharply triangular with concave sides or one of the sides nearly flat, erect, stiff, 1°–4° tall. Leaves 1–3, narrowly linear, keeled, shorter than the culm; spikelets oblong-ovoid, acute, 4″–6″ long, capitate in clusters of 1–7, appearing as if lateral; involucral leaf solitary, slender, 1½′–4′ long; scales broadly ovate, brown, often emarginate or sharply 2-cleft at the apex, the midvein extended into a subulate awn sometimes 1″ long, the margins scarious, ciliolate or glabrous; bristles 2–6, downwardly barbed, shorter than or equalling the achene; stamens 3; style usually 2-cleft; achene obovate, plano-convex, smooth, dark brown, mucronate.

In fresh water and brackish swamps throughout North America. Also in Chile. June–Sept.

Scirpus Americànus longispicàtus Britton, Trans. N. Y. Acad. Sci. 11: 78. 1892.

Spikelets linear-cylindric, 5″–12″ long; bristles as long as the broadly obovate achene. South shore of Lake Ontario; Colorado and New Mexico.



11. Scirpus Ólneyi A. Gray. Olney's Bulrush. (Fig. 619.)

Scirpus Olneyi A. Gray, Bost. Journ. Nat. Hist. 5: 238. 1845.

Similar to the preceeding species, perennial by long stout rootstocks, culms stout, sharply 3-angled with concave sides, 2°–7° tall. Leaves 1–3, 1′–5′ long, or sheaths sometimes leafless; spikelets capitate in dense clusters of 5–12, oblong or ovoid-oblong, obtuse, 2½″–4″ long, the solitary involucral leaf short, stout, erect, ½′–1¼′ long; scales oval or orbicular, dark brown with a green midvein, emarginate or mucronulate, glabrous; bristles usually 6, slightly shorter than or equalling the achene, downwardly barbed; stamens 2–3; style 2-cleft; achene obovate, plano-convex, brown, mucronate.

In salt marshes, Rhode Island to Florida, Texas, Mexico and California, extending north along the Pacific Coast to Oregon. Also in Arkansas. June–Sept.

12. Scirpus Tórreyi Olney. Torrey's Bulrush. (Fig. 620.)

Scirpus Torreyi Olney, Proc. Providence Frank. Soc. 1: 32. 1847.

Perennial by short or slender rootstocks, culms sharply 3-angled, rather slender, nodulose, 2°–4° tall. Leaves narrowly linear, elongated, nodulose, light green, sometimes overtopping the culm; spikelets 1–4, in an apparently lateral capitate cluster, oblong, narrowed at each end, 5″–8″ long; involucral leaf 2′–6′ long, erect; scales ovate or lanceolate, shining, chestnut-brown, glabrous, obtuse or the upper acute, mucronulate; bristles about 6, downwardly barbed, longer than the achene; stamens 3; style 3-cleft; achene obovoid, smooth, shining, light brown, 3-angled, one of its sides broader and flatter than the others.

In swamps, Vermont to Rhode Island and Pennsylvania, west to Minnesota and Manitoba. July–Sept.

13. Scirpus mucronàtus L. Bog Bulrush. (Fig. 621.)

Scirpus mucronatus L. Sp. Pl. 50. 1753.

Perennial, culms stout, somewhat tufted, sharply 3-angled, smooth, 1°–3° tall. Spikelets 5–12 in a capitate cluster, oblong, obtuse, many-flowered, 4″–9″ long, rather more than 1″ in diameter, subtended by the solitary linear abruptly spreading involucral leaf; scales broadly ovate, obtuse, light brown with a narrow green midvein, mucronate; bristles 6, stout, rigid, downwardly barbed, as long as the achene; stamens 3; style 3-cleft; achene obovoid, smooth, shining, dark brown, 3-angled, two of the sides narrower and more convex than the third.

In a swamp in Delaware county, Pennsylvania. Probably adventive or fugitive from Europe. Widely distributed in the Old World. July–Sept.

14. Scirpus cylíndricus (Torr.) Britton. Canby's Bulrush. (Fig. 622.)

Scirpus maritimus var. *cylindricus* Torr. Ann. Lyc. N. Y. 3: 325. 1836.
Scirpus leptolepis Chapm. Fl. S. States, 520. 1860.
Scirpus Canbyi A. Gray, Am. Journ. Sci. (II.) 38: 289. 1864.
Scirpus cylindricus Britton, Trans. N. Y. Acad. Sci. 11: 79. 1892.

Perennial by stout rootstocks, culm stout, sharply 3-angled above, 3°–6° high, the linear nodulose keeled and channeled dark green leaves nearly or quite as long. Involucral leaf solitary, 4′–10′ long, erect; spikelets in an apparently lateral simple or compound umbel, drooping, oblong-cylindric, acutish, 6″–10″ long; primary rays of the umbel 1′–4′ long, bracted by 1 or more subulate-linear leaves; scales ovate or ovate-lanceolate, pale brown with scarious margins, acute, mucronulate; bristles 6, stout, rigid, about as long as the achene, serrate; stamens 3; style 3-cleft; achene obovoid, 3-angled, light brown, smooth, abruptly subulate-pointed.

In ponds and swamps, Maryland to Florida and Louisiana, mostly near the coast. July–Sept.

15. Scirpus lacústris L. Great Bulrush. Mat-rush. (Fig. 623.)

Scirpus lacustris L. Sp. Pl. 48. 1753.
Scirpus validus Vahl, Enum. 2: 268. 1806.

Perennial by stout rootstocks, culm stout, terete, smooth, erect, 3°–9° tall, sometimes nearly 1′ in diameter, sheathed below, the upper sheath occasionally extended into a short leaf. Involucral leaf solitary, erect, shorter than the umbel, appearing as if continuing the culm; umbel compound, appearing lateral, its primary rays slender, spreading, 1′–4′ long, bracts linear-lanceolate, scarious; spikelets oblong-conic, becoming oblong-cylindric, sessile or some of them peduncled, in capitate clusters of 1–5, obtuse or acute, 2½″–8″ long, 1½″–2″ in diameter; scales ovate or oblong, with a rather strong midvein which is sometimes excurrent into a short tip; bristles 4–6, downwardly barbed, equalling or longer than the achene; stamens 3; style 2-cleft; achene plano-convex, obovate, gray, abruptly mucronate, dull.

In ponds and swamps, throughout North America. Also in the Old World. June–Sept

16. Scirpus Califórnicus (C. A. Meyer) Britton. California Bulrush. (Fig. 624.)

Elytrospermum Californicum C. A. Meyer, Mem. Acad. St. Petersb. (V.) 1: 201. *pl. 2.* 1831.
Scirpus Tatora Kunth, Enum. 2: 166. 1837.
Scirpus Californicus Britton, Trans. N. Y. Acad. Sci. 11: 79. 1892.

Perennial, similar to the preceding species, the leaves reduced to basal sheaths. Involucral leaf very short, stoutly subulate, umbel compound; spikelets 3″–5″ long, acute, peduncled or some of them sessile; scales brown, ovate, awn-pointed by the excurrent midvein; bristles shorter than or equalling the achene, short-plumose below; stamens 2–3; style 2-cleft; achene obovate, plano-convex, nearly white, narrowed above into a short point, contracted at the base, its surface finely cellular-reticulated.

In swamps, Florida to Louisiana, New Mexico and California, and widely distributed in tropical America. Not certainly known within our area. June–Aug.

17. Scirpus rùfus (Huds.) Schrad. Red Clubrush. (Fig. 625.)

Schoenus rufus Huds. Fl. Angl. Ed. 2, 15. 1778.
Scirpus rufus Schrad. Fl. Germ. 1: 133. 1806.

Perennial by slender rootstocks, culms tufted, smooth, slender, erect, somewhat compressed, 3′–15′ tall. Leaves half-terete, smooth, shorter than the culm, channeled, ½′–3′ long, less than 1′ wide, the lowest reduced to bladeless sheaths; spikelets red-brown, few-flowered, narrowly ovoid-oblong, subacute, about 3″ long, erect in a terminal 2-ranked spike ½′–1′ long; involucral leaf solitary, erect, narrowly linear, equalling or longer than the spike; scales lanceolate, acute, 1-nerved; bristles 3–6, upwardly barbed, shorter than the achene, deciduous; stamens 3; style 2-cleft; achene oblong, pointed at both ends, light brown, plano-convex or slightly angled in front, 1½″–2″ long.

In marshes, New Brunswick and Quebec to the Northwest Territory. Also in northern Europe. Summer.

18. Scirpus campéstris Britton. Prairie Bulrush. (Fig. 626.)

Perennial by slender rootstocks, culm slender, smooth, sharply triangular, 1°–2° tall. Leaves usually pale green, smooth, shorter than or overtopping the culm, 1″–2″ wide, those of the involucre 2 or 3, the longer much exceeding the inflorescence; spikelets 3–10 in a dense terminal simple head, oblong-cylindric, mostly acute, 8″–12″ long, 2½″–4″ in diameter; scales ovate, membranous, puberulent or glabrous, pale brown, 2-toothed at the apex, the midvein excurrent into an ascending or spreading awn about 1″ long; bristles 1–3, much shorter than the achene or none; style 2-cleft (sometimes 3-cleft?); achene lenticular, obovate or oblong-ovate, mucronulate, yellow-brown, its surface strongly cellular-reticulated.

On wet prairies and plains, Manitoba and Minnesota to Nebraska, Kansas and Mexico, west to Nevada. May–Aug.

19. Scirpus robústus Pursh. Salt Marsh Bulrush. (Fig. 627.)

Scirpus robustus Pursh, Fl. Am. Sept. 56. 1814.
Scirpus maritimus var. *macrostachyus* Michx. Fl. Bor. Am. 1: 32. 1803. Not *S. macrostachyus* Lam.

Perennial by large rootstocks, culm stout, stiff, sharply 3-angled with flat sides, smooth, 2°–5° tall. Leaves equalling or overtopping the culm, dark green, smooth, 2½″–5″ wide, the midvein prominent; involucral leaves 2–4, elongated, erect, similar to those of the culm, often 1′ long; spikelets ovoid-oblong, obtuse or subacute, stout, 8″–12″ long, 4″–5″ in diameter, 6–20 together in a dense often compound terminal cluster; scales ovate, brown, puberulent, thin, lacerate or 2-toothed at the apex, the midvein excurrent into an, at length, reflexed awn 1½″–2½″ long; bristles 1–6, fragile, shorter than the achene or none; stamens 3; style 3-cleft; achene compressed, very flat on the face, convex or with low ridge on the back, obovate-orbicular, dark brown, shining, 1½″ long.

In salt marshes, Nova Scotia to Texas. July–Oct.

20. Scirpus fluviátilis (Torr.) A. Gray. River Bulrush. (Fig. 628.)

Scirpus maritimus var. *fluviatilis* Torr. Ann. Lyc. N. Y. 3: 324. 1836.
Scirpus fluviatilis A. Gray, Man. 527. 1848.

Perennial by large rootstocks, culm stout, smooth, sharply triangular with nearly flat sides, 3°–6° tall. Leaves 4″–8″ wide, smooth, equalling or overtopping the culm, attenuate to a very long tip, the midvein prominent; those of the involucre 3–5, erect or spreading, some of them 5′–10′ long; spikelets in a terminal umbel, solitary, or 2–3 together at the ends of its long spreading or drooping rays, or the central spikelets sessile, oblong-cylindric, acute, 8″–12″ long, about 3½″ in diameter; scales ovate, scarious, puberulent, the midvein excurrent into a curved awn 1½″–2″ long; bristles 6, rigid, downwardly barbed, about as long as the achene; style 3-cleft; achene sharply 3-angled, obovoid, rather dull, short-pointed, 2″ long.

In shallow water along lakes and streams, Quebec to Minnesota, New Jersey, Illinois and Kansas. June–Sept.

21. Scirpus sylváticus L. Wood Bulrush. (Fig. 629.)

Scirpus sylvaticus L. Sp. Pl. 51. 1753.

Perennial by long rootstocks, culm triangular, stout, smooth, 4°–6° tall, often overtopped by the upper leaves. Leaves flat, 5″–8″ wide, rough on the margins, more or less rugulose, the midvein prominent, those of the involucre 5–8, the larger similar to those of the culm and often 1° long or more; umbel terminal, very large, sometimes 8′ broad, about 3 times compound, the spikelets ovoid or ovoid-oblong, mostly acute, 1½″–2½″ long, borne in capitate clusters of 2–8 at the ends of the raylets; bractlets of the involucels small, scarious, linear or lanceolate; scales ovate-oblong, obtuse, brown with a green centre; bristles 6, downwardly barbed, slightly exceeding the achene; stamens 3; style 3-cleft; achene oblong, 3-angled, obtuse, nearly white, mucronulate, not shining.

In swamps, Massachusetts to North Carolina. Also in Europe. June–Aug.

22. Scirpus atróvirens Muhl. Dark green Bulrush. (Fig. 630.)

Scirpus atrovirens Muhl. Gram. 43. 1817.

Perenuial by sleuder rootstocks, culms triangular, rather slender, leafy, 2°–4° high. Leaves elongated, nodulose, rough on the margins, dark green, 3″–6″ wide, one or two of them usually exceeding the inflorescence; umbel 1–2-compound or simple; spikelets ovoid-oblong, acute, densely capitate in 6's–20's at the euds of the rays or raylets; involucels short; scales greenish-brown, oblong, acute, the midvein excurrent; bristles usually 6, downwardly barbed above, naked below, about as long as the achene; stamens 3; style 3-cleft; achene oblong-obovoid, 3-angled, pale brown, dull.

In swamps, Nova Scotia to Manitoba, south to Georgia and Louisiana. June–Aug.

Scirpus atróvirens pállidus Britton, Trans. N. Y. Acad. Sci. 9: 14. 1889.

Whole plant pale green; scales awned; spikelets oblong-cylindric, very numerous in the capitate elusters. Minnesota to the Northwest Territory and Colorado.

23. Scirpus microcàrpus Presl. Small-fruited Bulrush. (Fig. 631.)

Scirpus microcarpus Presl, Rel. Haenk. 1: 195. 1828.
Scirpus sylvaticus var. *digynus* Boeckl. Linnaea, 36: 727. 1870.

Perennial, the culms 3°–5° tall, often stout, overtopped by the rough-margined leaves. Longer leaves of the involucre usually exceeding the inflorescence; spikelets ovoid-oblong, acute, 1½″–2″ long, 3–25 together in capitate clusters at the ends of the usually spreading raylets; scales brown with a green midvein, bluut or subacute; bristles 4, barbed downwardly nearly or quite to the base, somewhat longer than the achene; stamens 2; style 2-cleft; achene oblong-obovate, nearly white, plano-convex or with a low ridge on the back, pointed.

In swamps and wet woods, Nova Scotia to Quebec and Alaska, south to New Hampshire, northern New York, Minnesota, Nevada and California. July–Sept.

24. Scirpus polyphýllus Vahl. Leafy Bulrush. (Fig. 632.)

Scirpus polyphyllus Vahl, Enum. 2: 274. 1806.

Perennial by slender rootstocks, culms slender, sharply triangular, 1½°–4° tall, very leafy, the leaves 2″–3″ wide, exactly 3-ranked, inconspicuously nodulose, rough-margined, the upper rarely overtopping the culm; leaves of the involucre 3–6, the longer commonly somewhat exceeding the inflorescence; umbel more or less compound; spikelets ovoid, about 1½″ long, capitate in 3's–10's at the ends of the raylets; scales ovate, bright brown, mostly obtuse, mucronulate; bristles 6, flexuous or twice bent, downwardly barbed above the middle, twice as long as the achene; stamens 3; style 3-cleft; achene obovoid, 3-angled with a broad face and narrower sides, short-pointed, dull.

In swamps, wet woods and meadows, Massachusetts to Minnesota, south to Alabama and Arkansas. Some of the scales of the spikelets occasionally develop into linear leaves. July–Sept.

25. Scirpus Péckii Britton. Peck's Bulrush. (Fig. 633.)

Scirpus Peckii Britton, Trans. N. Y. Acad. Sci. 11: 82. 1892.

Perennial by rootstocks, culms slender, triangular, 1½°–3½° tall, leafy. Leaves elongated, 2″–5″ wide, rough-margined, the upper overtopping the culm, those of the involucre 3–5, the longer of them exceeding the inflorescence; umbel 1–2-compound, large; spikelets cylindric, obtusish, 3″–5″ long, in capitate clusters of 2–10 at the ends of the raylets or some of them distinctly peduncled; scales dark brown, keeled, mucronate, falling early; bristles 4–6, downwardly barbed from below the middle to the summit, longer than the achene; style 3-cleft; achene 3-angled, ¼″ long, oblong, narrowed at each end, sleuder-beaked.

In swamps, Connecticut and New York. July–Sept.

26. Scirpus divaricàtus Ell. Spreading Bulrush. (Fig. 634.)

Scirpus divaricatus Ell. Bot. S. C. & Ga. 1: 88. *pl. 2. f. 4.* 1816.

Perennial (?). Roots fibrous, culms obtusely triangular, smooth, rather slender, 2½°–4° tall. Leaves 2″–4″ wide, rough-margined, the upper and those of the involucre not exceeding the inflorescence; umbel decompound, the primary rays very slender, sometimes 6′ long, widely spreading or drooping; raylets filiform; involucels setaceous; spikelets mostly solitary at the ends of the raylets, sessile or peduncled, linear-oblong, obtuse, 3″–6″ long, ½″ thick; scales ovate, greenish-brown, subacute or obtuse, with a prominent midveiu aud scarious margins; bristles 6, flexuous, longer than the achene, somewhat pubescent, not barbed, shorter than the scales; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, narrowed at both ends, apiculate, nearly white, uot shining.

In swamps, Kentucky to Missouri, south to Florida and Louisiana. The spikelets sometimes partially develop into tufts of leaves. June–Aug.

27. Scirpus lineàtus Michx. Reddish Bulrush. (Fig. 635.)

Scirpus lineatus Michx. Fl. Bor. Am. 1: 32. 1803.

Perennial by stout rootstocks, culms rather slender, triangular, erect, 1°–3° high, leafy, the upper leaves and those of the involucre not exceeding the inflorescence. Leaves 2″–4″ wide, light green, flat, rough-margined; umbels terminal and commouly also axillary, decompound, the rays very slender, becoming pendulous; spikelets mostly solitary at the ends of the slender raylets, oblong, obtuse, 3″–5″ long, about 1″ in diameter; scales ovate or oblong, reddish-brown with a green midvein, their tips slightly spreading; bristles 6, weak, smooth, entangled, much longer than the achene, equalling the scales or slightly protruded beyond them at maturity; stamens 3; style 3-cleft; achene oblong or oblong-obovoid, pale brown, narrowed at both ends, 3-angled, short-beaked.

In swamps and wet meadows, Ontario to Georgia, west to Oregon and Texas. June–Sept.

28. Scirpus cypérinus (L.) Kunth. Wool-grass. (Fig. 636.)

Eriophorum cyperinum L. Sp. Pl. Ed. 2, 77. 1762.
Scirpus cyperinus Kunth, Enum. 2: 170. 1837.
Scirpus Eriophorum var. *cyperinus* A. Gray, Man. Ed. 2, 501. 1856.

Perennial by stout rootstocks, culms stout or slender, smooth, obtusely triangular or nearly terete, stiff, leafy, 2°–6° tall. Leaves elongated, 2″–3″ wide, rough-margined, the upper often overtopping the culm, those of the involucre 3–6, the longer much exceeding the inflorescence; umbel terminal, compound, the rays at length somewhat drooping; spikelets ovoid-oblong, obtuse, 1½″–2½″ long, in capitate clusters of 3–15 at the ends of the raylets; scales ovate or lanceolate, acute or subacute; bristles 6, entangled, smooth, much longer than the achene, much exserted beyond the scales and grayish-brown at maturity; stamens 3; style 3-cleft; achene 3-angled, oblong, slender-beaked, nearly white.

In swamps, Newfoundland to Ontario, Virginia and Kentucky. Aug.–Sept.

Scirpus cypérinus Erióphorum (Michx.) Britton, Trans. N. Y. Acad. Sci. 11: 82. 1892.
Scirpus Eriophorum Michx. Fl. Bor. Am. 1: 33. 1803.
Eriophorum cyperinum var. *laxum* Wats. & Coult. in A. Gray, Man. Ed. 6, 582. 1890.
Spikelets mostly peduncled. Range of the type, but extending to Florida and Louisiana.

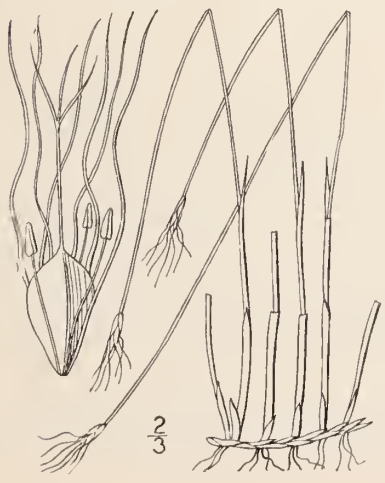
10. ERIÓPHORUM L. Sp. Pl. 52. 1753.

Bog sedges, perennial by rootstocks, the culms erect, triangular or nearly terete, the leaves linear, or 1 or 2 of the upper ones reduced to bladeless sheaths. Spikelets terminal, solitary, capitate or umbelled, subtended by a 1–several-leaved involucre, or naked. Scales spirally imbricated, usually all fertile. Flowers perfect. Perianth of 6 or numerous filiform smooth soft bristles, which are white or brown, straight or crisped, and exserted much beyond the scales at maturity. Stamens 1–3. Style 3-cleft. Achene 3-angled, oblong, ellipsoid or obovoid. [Greek, signifying wool-bearing, referring to the soft bristles.]

About 10 species, in the northern hemisphere. Besides the following, one occurs in Alaska.

Spikelet solitary; involucral leaf short or none.
  Bristles only 6, white, crisped, very long. 1. *E. alpinum.*
  Bristles numerous, straight or slightly crisped.
    Bristles bright white.
      Culm with 2 inflated bladeless sheaths; achene obovoid, obtuse. 2. *E. vaginatum.*
      Only the upper sheath bladeless, or all blade-bearing; achene linear-oblong, acute. 3. *E. Scheuchzeri.*
    Bristles reddish-brown. 4. *E. russeolum.*
Spikelets several, umbellate or capitate; involucre 1–4-leaved.
  Achene obovoid, obtuse; spikelets umbellate. 5. *E. polystachyon.*
  Achene linear-oblong, acute; spikelets capitate or some of them peduncled.
    Leaves channeled; bristles 4–6 times as long as the scale, bright white. 6. *E. gracile.*
    Leaves flat; bristles 3 times as long as the scale, brown (rarely white). 7. *E. Virginicum.*

1. Eriophorum alpìnum L. Alpine Cotton-grass. (Fig. 637.)



Eriophorum alpinum L. Sp. Pl. 53. 1753.

Perennial by short rootstocks, sending up numerous filiform triangular roughish culms, 6′–10′ high. Leaves subulate, 3″–10″ long, triangular, channeled, borne very near the base of the culm, the lower sheaths often scarious and bladeless; spikelet solitary, terminal, small, erect; involucral bract subulate, mostly shorter than the spikelet, sometimes wanting; young spikelet ovoid-oblong, subacute; scales oblong lanceolate, yellowish-brown, firm, obtuse or subacute, the midvein slender; bristles 6, white, crisped, 4–7 times as long as the scale; achene narrowly obovoid-oblong, brown, apiculate, dull.

In bogs and on high mountains, Newfoundland to Hudson Bay and the Northwest Territory, south to Vermont, northern New York and Minnesota. Also in Europe and Asia. Summer.

2. Eriophorum vaginàtum L. Sheathed Cotton-grass. (Fig. 638.)

Eriophorum vaginatum L. Sp. Pl. 52. 1753.

Culms tufted, stiff, obtusely triangular, smooth, slender, 8′–16′ tall, leafless, except at the base, bearing two distant inflated sheaths, the upper one usually above the middle. Leaves stiff, filiform, triangular, channeled, slightly rough, shorter than or sometimes overtopping the culm; involucral leaf wanting; spikelet solitary, ovoid, erect; scales ovate-lanceolate or the lowest lanceolate, acuminate, purple-brown, thin; bristles numerous, white, straight, glossy, 4–5 times as long as the scale; anthers linear; achene obovoid, obtuse, brown, dull, minutely apiculate.

In bogs, Newfoundland to Alaska, south to Massachusetts, Pennsylvania and Minnesota. Also in northern Europe and Asia. June–Aug.

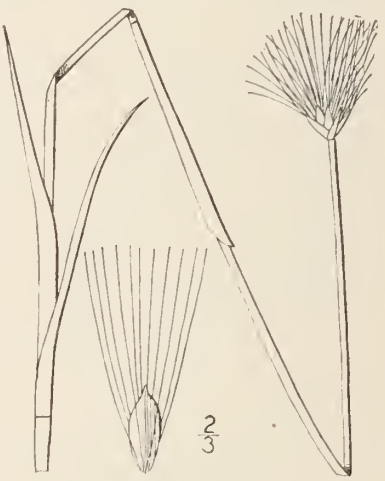
3. Eriophorum Scheuchzèri Hoppe. Scheuchzer's Cotton-grass. (Fig. 639.)

Eriophorum Scheuchzeri Hoppe, Taschenb. 1800: 104. 1800.

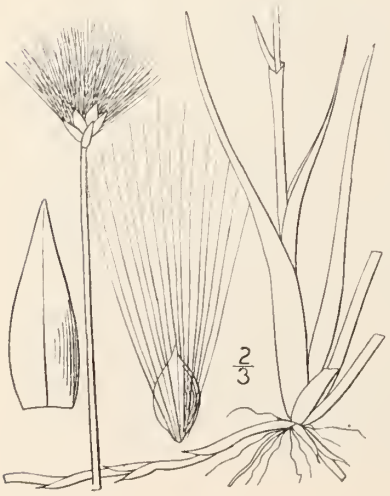
Eriophorum capitatum Host, Gram. Aust. 1: 30. *pl. 38.* 1801.

Similar to the preceding species but the sheaths all blade-bearing or only the upper one bladeless, culms slender, smooth, nearly terete, 10′–20′ tall. Leaves filiform, channeled, usually much shorter than the culm; spikelet solitary, terminal, erect; involucre none; scales ovate-lanceolate, long-acuminate, purple-brown, membranous; bristles numerous, white or slightly yellowish, weak, nearly straight, 4–5, times as long as the scale; "anthers cordate-ovate;" achene narrowly oblong, acute, brown, dull, subulate-beaked.

In bogs, Newfoundland and Labrador to Manitoba, Alaska and Oregon. Also in Europe. Summer.



4. Eriophorum russèolum Fries. Russet Cotton-grass. (Fig. 640.)

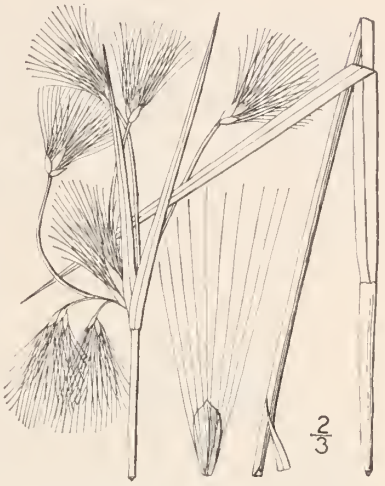


Eriophorum russeolum Fries, Novit. Mant. 3: 67. 1842.

Culms solitary or little tufted, triangular, erect, smooth, 8′–18′ tall, much longer than the leaves. Upper sheath inflated, bladeless, mucronate, rarely with a short subulate blade, usually borne below the middle of the culm; leaves filiform, triangular-channeled, mucronate, 1′–4′ long; spikelet solitary, erect; involucre none; scales ovate-lanceolate, acuminate, thin, purplish-brown with nearly white margins; bristles numerous, bright reddish-brown, 3–5 times as long as the scale; achene oblong, narrowed at each end, apiculate.

Scarcely differs from the preceding species except in the color of the bristles and the shorter-pointed achene. In bogs, Newfoundland to Quebec. June–Aug.

5. Eriophorum polystàchyon L. Tall Cotton-grass. (Fig. 641.)



Eriophorum polystachyon L. Sp. Pl. 52. 1753.
Eriophorum latifolium Hoppe, Taschenb. 1800: 103. 1800.

Culm stiff, smooth, obtusely triangular above, nearly terete below, 1½°–3° tall, all the sheaths blade-bearing. Leaves flat, roughish-margined, 1½″–4″ wide, tapering to a triangular channeled rigid point, the upper shorter than or rarely overtopping the culm, those of the involucre 2–4, the longer commonly equalling or exceeding the inflorescence; spikelets 3–12, ovoid, or oblong, drooping, in a terminal simple or more or less compound umbel; rays filiform, smooth or rough; scales ovate-lanceolate, acute or acuminate, purple-green or brown; bristles numerous, bright white, about 1′ long, 4–5 times as long as the scale; achene obovoid, obtuse, light brown.

In bogs, Newfoundland to Alaska, south to New Jersey, Georgia and Nebraska. Also in Europe and Asia. June–Aug.

6. Eriophorum grácile Koch. Slender Cotton-grass. (Fig. 642.)

Eriophorum gracile Koch; Roth, Catal. Bot. 2: 259. 1800.
Eriophorum triquetrum Hoppe, Taschenb. 1800: 106. 1800.

Culm slender, obtusely triangular, rough on the angles, 1°–2° tall, the sheaths all blade-bearing. Leaves narrowly linear, 1″ wide or less, triangular-channeled, rough-margined, the upper not overtopping the culm; involucral leaf commonly only 1, stiff, erect; spikelets 3–8, capitate or subumbellate, the longer-peduncled ones drooping; scales ovate or oblong, obtuse or subacute, greenish brown, the mid-vein rather strong, often with a weaker nerve on each side; bristles numerous, bright white, 8″–12″ long, 4–6 times as long as the scale; achene linear-oblong, acute, pointed.

In bogs, Newfoundland to Hudson Bay and Alaska, south to New Jersey, Pennsylvania and Missouri. Also in Europe and Asia. June–Sept.

7. Eriophorum Virgínicum L. Virginia Cotton-grass. (Fig. 643.)

Eriophorum Virginicum L. Sp. Pl. 53. 1753.

Culm stiff, rather slender, obtusely triangular above, terete below, smooth, 1½°–4° tall, rather leafy. Leaves narrowly linear, flat, 1″–2½″ wide, rough-margined, somewhat channeled toward the apex, the upper often overtopping the culm, those of the involucre 2–4, spreading or deflexed, 2′–6′ long, 1 or 2 of them much longer than the spikelets; spikelets several or numerous in a dense terminal capitate cluster usually broader than high, erect or the outer ones spreading; scales ovate, acute, brown with a green centre, about 5-nerved; bristles numerous, dingy brown, about 3 times as long as the scale; achene linear-oblong, acute, apiculate, light brown.

In bogs, Newfoundland to Manitoba, south to Florida and Nebraska. June–Sept.

Eriophorum Virgínicum álbum A. Gray, Man. Ed. 5, 566. 1867.
Bristles white. Northern New York.

11. FUIRÈNA Rottb. Descr. & Ic. 70. *pl. 19. f. 3.* 1773.

Perennial sedges, with leafy triangular culms (in a southern species the leaves reduced to inflated sheaths), and many-flowered terete spikelets in terminal and axillary clusters, or rarely solitary. Scales spirally imbricated all around, awned, the 1 or 2 lower commonly empty. Flowers perfect. Perianth of 3 ovate oblong or cordate-ovate, stalked, often awned sepals, usually alternating with as many downwardly barbed bristles. Stamens 3. Style 3-cleft, not swollen at the base, deciduous. Achene stalked or nearly sessile, sharply 3-angled, acute or mucronate, smooth. (In honor of Georg Fuiren, 1581–1628, Danish physician.)

About 20 species, natives of warm-temperate and tropical regions. Besides the following, 1 or 2 others occur in the southern United States.

Sepals awned from the apex or awnless. 1. *F. squarrosa.*
Sepals awned on the back below the apex. 2. *F. simplex.*

1. Fuirena squarròsa Michx. Squarrose Fuirena. (Fig. 644.)

Fuirena squarrosa Michx. Fl. Bor. Am. 1: 37. 1803.
Fuirena squarrosa var. *pumila* Torr. Fl. U. S. 1: 68. 1824.

Rootstock short, stout, sometimes tuber-bearing; culms tufted, glabrous or nearly so, 2′–2° tall. Leaves flat, nearly or quite glabrous or the lower sheaths pubescent; spikelets sessile and 1–10 together in terminal and usually also lateral capitate clusters, ovoid or ovoid-oblong, acute or obtuse, 3″–6″ long, about 2½″ in diameter; scales ovate or oblong, brown, pubescent, mostly obtuse, 3-nerved, tipped with a stout spreading or recurved awn of nearly their own length; sepals oblong, long-stalked, usually narrowed at both ends, tapering into a slender terminal downwardly barbed or sometimes smooth awn; bristles mostly longer than the achene, sometimes as long as the sepals.

In wet meadows and marshes, Massachusetts to Florida and Louisiana, near the coast. Also in Michigan and Nebraska. July–Sept.

Fuirena squarròsa hìspida (Ell.) Chapm. Fl. S. States, 514. 1860.
Fuirena hispida Ell. Bot. S. C. & Ga. 1: 579. 1821.

Sheaths and leaves hirsute; sepals ovate, cordate at the base or abruptly narrowed into the stalk, awnless or very short-awned at the apex; bristles usually shorter than or equalling the achene; plant usually taller. New York to Florida, west to Alabama and Texas. Perhaps a distinct species.

2. Fuirena símplex Vahl. Western Fuirena. (Fig. 645.)

Fuirena simplex Vahl, Enum. 2: 384. 1806.
Fuirena squarrosa var. *aristulata* Torr. Ann. Lyc. N. Y. 3: 291. 1836.

Similar to the preceding species, rootstock short, thick; culms slender, 5′–2° tall, glabrous. Leaves flat, glabrous or ciliate; scales tipped with a spreading or reflexed awn; sepals ovate-oblong, obtuse and usually notched at the apex, obtuse, truncate or subcordate at the base, longer or shorter than their stalks, awned on the back from below the apex, the awn varying in length, smooth or downwardly barbed; bristles retrorsely hispid, equalling or exceeding the sessile or short-stalked achene.

In moist soil, Kansas to Texas and Mexico. June–Sept.

12. HEMICÀRPHA Nees & Arn. Edinb. New Phil. Journ. 17: 263. 1834.

Low tufted mostly annual sedges, with erect or spreading, almost filiform culms and leaves, and terete small terminal capitate or solitary spikelets subtended by a 1–3-leaved involucre. Scales spirally imbricated all around, deciduous, all subtending perfect flowers. Perianth of a single hyaline sepal (bract?) between the flower and the rachis of the spikelet; bristles none. Stamens 1–3. Style 2-cleft, deciduous, not swollen at the base. Achene oblong, turgid or lenticular. (Greek, in allusion to the single sepal.)

About 3 species, natives of temperate and tropical regions. Besides the following, another occurs in the southwestern United States. The genus differs from *Scirpus*, with which it is united by some authors, mainly in the presence of the perianth-scale.

1. **Hemicarpha micrántha** (Vahl) Britton. Hemicarpha. (Fig. 646.)

Scirpus micranthus Vahl, Enum. 2: 254. 1806.
Hemicarpha subsquarrosa Nees, in Mart. Fl. Bras. 2: Part 1, 61. 1842.
Hemicarpha micrantha Britton, Bull. Torr. Club, 15: 104. 1888.

Annual, glabrous, culms densely tufted, compressed, grooved, diffuse or ascending, 1′–5′ long, mostly longer than the setaceous smooth leaves. Spikelets ovoid, many-flowered, obtuse, about 1″ long, capitate in 2's–4's or solitary; involucral leaves or one of them usually much exceeding the spikelets; scales brown, obovate, with a short blunt spreading or recurved point; sepal inconspicuous; stamen 1; achene obovate-oblong, obtuse, mucronulate, little compressed, light brown, its surface minutely cellular-reticulated.

In moist, sandy soil, Rhode Island to Pennsylvania, Florida, Texas and Mexico. July–Sept.

Hemicarpha micrántha aristulàta Coville, Bull. Torr. Club, 21: 36. 1894.

Scales pale, cuneate-obovate, tapering into squarrose awns about their own length. Kansas to Texas.

13. LIPOCÀRPHA R. Br. App. Tuckey Exp. Congo, 459. 1818.

Low annual sedges, with slender tufted culms leafy at the base, and terete many-flowered spikelets in a terminal head, subtended by a 1–several-leaved involucre. Scales firm, spirally imbricated all around, all fertile or several of the lower ones empty, at length deciduous. Flowers perfect. Perianth of two small sepals (bracts?) one on each side of the flower; bristles none. Stamens 1–2. Style 2–3-cleft, deciduous, its base not swollen. Achene plano-convex or 3-angled. (Greek, alluding to the thick sepals in some species.)

About 7 species, widely distributed in warm and tropical regions.

1. **Lipocarpha maculàta** (Michx.) Torr. American Lipocarpha. (Fig. 647.)

Kyllingia maculata Michx. Fl. Bor. Am. 1: 29. 1803.
Lipocarpha maculata Torr. Ann. Lyc. N. Y. 3: 288. 1836.

Annual, glabrous, roots fibrous, culms tufted, grooved, compressed, smooth, longer than the narrowly linear somewhat channeled leaves, 3′–10′ tall. Leaves of the involucre 2–4, the larger 1′–5′ long; spikelets ovoid-oblong, obtuse, 2½″–3″ long, 1″ in diameter, 2–6 together in a terminal capitate cluster; scales rhombic or lanceolate, acute at the apex, curved, the sides nearly white, or flecked with reddish-brown spots, the midvein green; exterior sepal convolute around the achene, nerved, hyaline; stamen 1; achene oblong, yellowish, contracted at the base.

In wet or moist soil, eastern Virginia to Florida. Also near Philadelphia, where it is probably adventive. July–Sept.

14. RYNCHÓSPORA Vahl, Enum. 2: 229. 1806.

Leafy sedges, mostly perennial by rootstocks, with erect 3-angled or terete culms, narrow flat or involute leaves, and ovoid oblong or fusiform, variously clustered spikelets. Scales thin, 1-nerved, imbricated all around, usually mucronate by the excurrent midvein, the lower empty. Upper flowers imperfect, the lower perfect. Perianth of 1–20 (mostly 6) upwardly or downwardly barbed or scabrous bristles, wanting in some species (no. 2). Stamens commonly 3. Style 2-cleft, 2-toothed or rarely entire. Achene lenticular or swollen, not 3-angled, smooth or transversely wrinkled, capped by the persistent base of the style (tubercle), or in some species by the whole style. [Greek, referring to the beak-like tubercle.]

About 200 species, of wide geographic distribution, most abundant in warm regions. Besides the following, some 27 others occur in the southern United States.

Style entire or 2-toothed, persistent as a long-exserted subulate beak. 1. *R. corniculata.*
Style deeply 2-cleft, only its base persistent as a tubercle.
  Bristles minute or wanting. 2. *R. pallida.*
  Bristles plumose. 3. *R. oligantha.*
  Bristles downwardly barbed or rarely smooth.
    Scales white or nearly so; bristles 9–15. 4. *R. alba.*
    Scales brown; bristles 6.
      Leaves filiform; achene oblong. 5. *R. capillacea.*
      Leaves narrowly linear, flat; achene obovate.
        Bristles equalling the achene; tubercle one-half as long or less. 6. *R. Knieskernii.*
        Bristles reaching or exceeding the end of the tubercle, which is as long as the achene.
          Spikelets few–several in numerous rather loose clusters. 7. *R. glomerata.*
          Spikelets very numerous in 2–6 very dense globose heads. 8. *R. axillaris.*
  Bristles upwardly barbed.
    Spikelets very numerous in 2–6 very dense globose heads. 8. *R. axillaris.*
    Spikelets few–several in rather loose clusters.
      Achene smooth.
        Leaves setaceous; achene obovate, shining. 9. *R. fusca.*
        Leaves narrowly linear, flat; achene broadly oval, dull. 10. *R. gracilenta.*
      Achene transversely wrinkled.
        Spikelets ovoid, in erect cymose clusters; achene longer than the bristles.
          Leaves flat; spikelets nearly or quite sessile. 11. *R. cymosa.*
          Leaves involute; spikelets distinctly pedicelled. 12. *R. Torreyana.*
        Spikelets spindle-shaped, in drooping panicles; achene shorter than the bristles. 13. *R. inexpansa.*

1. Rynchospora corniculàta (Lam.) A. Gray. Horned Rush. (Fig. 648.)

Schoenus corniculatus Lam. Tabl. Encycl. 1: 137. 1791.
Rhynchospora corniculata A. Gray, Ann. Lyc. N. Y. 3: 205. 1835.

Culm obtusely triangular, stout or rather slender, smooth, 3°–7° tall. Leaves flat, broadly linear, 6′–18′ long, 3″–8″ wide, rough-margined; umbels terminal and axillary, sometimes 1° broad, usually compound; spikelets spindle-shaped, 4″–6″ long in flower, capitate at the ends of the rays and raylets; primary rays slender, sometimes 6′ long; scales lanceolate, thin, acute, light brown; bristles about 6, subulate or filiform, rigid, upwardly scabrous, shorter than, equalling or exceeding the achene; style subulate, entire or minutely 2-toothed at the apex, 2–4 times longer than the achene, upwardly scabrous, ½′–1′ long, persistent and much exserted beyond the scales when mature; achene obovate, flat on both sides, 2″ long, dark brown, smooth, its surface minutely cellular-reticulated.

In swamps, Delaware to Florida, west to Ohio, Missouri and Texas. July–Sept.

Rhynchospora corniculàta macrostàchya (Torr.) Britton, Trans. N. Y. Acad. Sci. 11: 84. 1892.
Rhynchospora macrostachya Torr. Ann. Lyc. N. Y. 3: 206. 1835.

Bristles about twice as long as the achene. Range of the type, but extending north to Massachusetts and Rhode Island.

2. Rynchospora pállida M. A. Curtis. Pale Beaked-rush. (Fig. 649.)

Rhynchospora pallida M. A. Curtis, Am. Journ. Sci. (II.) 7: 409. 1849.

Rootstocks slender, culms sharply triangular, 1½°–2½° tall. Leaves ½″–1″ wide, flattish, nearly smooth, the lowest reduced to many-nerved lanceolate acuminate scales; spikelets numerous, spindle-shaped, narrow, 2″–3″ long, aggregated in a compound convex terminal head, or occasionally also in a filiform-stalked cluster from the upper axil; uppermost leaves subulate, little exceeding the spikelets; scales pale greenish brown, lanceolate, acuminate; bristles minute and early deciduous, or wanting; style 2-cleft; achene lenticular, obovate-oblong, smooth, brown, somewhat shining, ½″ long, tipped by a short tubercle.

In pine barren bogs, New Jersey to North Carolina. Aug.–Sept.

3. Rynchospora oligántha A. Gray. Few-flowered Beaked-rush. (Fig. 650.)

Rhynchospora oligantha A. Gray, Ann. Lyc. N. Y. 3: 212. 1835.

Rootstocks short, culms tufted, almost thread-like, leafy only toward the base, 6′–16′ tall. Leaves filiform, resembling and shorter than the culm or sometimes equalling it; spikelets 1–4, terminal, narrowly oblong, acute, 3″–4″ long, sessile or peduncled, subtended by 1 or 2 filiform bracts; scales ovate, pale brown, acute, cuspidate; bristles usually 6, densely plumose below the middle, upwardly scabrous above, equalling or shorter than the achene; style 2-cleft; achene obovoid-oblong, obtuse, turgid-lenticular, pale brown, dull, transversely wrinkled; tubercle with a flat depressed border and a flattened conic acute central projection about one-fifth as long as achene.

In wet sandy soil, Delaware to Florida and Texas, near the coast. June–Aug.

4. Rynchospora álba (L.) Vahl. White Beaked-rush. (Fig. 651.)

Schoenus albus L. Sp. Pl. 44. 1753.
Rynchospora alba Vahl, Enum. 2: 236. 1806.

Pale green, rootstocks short, culms slender or almost filiform, glabrous, 6′–20′ tall. Leaves bristle-like, ¼″–½″ wide, shorter than the culm, the lower very short; spikelets several or numerous, in 1–4 dense corymbose terminal and axillary clusters, narrowly oblong, acute at both ends, 2″–3″ long; scales ovate or ovate-lanceolate, white, acute; bristles 9–15, downwardly barbed, slender, about as long as the achene and tubercle; style 2-cleft; achene obovate-oblong, smooth, pale brown, lenticular; tubercle triangular-subulate, flat, one-half as long as the achene.

In bogs, Newfoundland to Alaska, south to Florida, Kentucky, Minnesota and Oregon. Also in northern Europe and Asia. June–Aug.

5. Rynchospora capillàcea Torr. Capillary Beaked-rush. (Fig. 652.)

Rhynchospora capillacea Torr. Comp. 41. 1826.

Culms filiform, tufted, glabrous, 6′–20′ tall. Leaves filiform, less than ¼″ wide, much shorter than the culm, the lower very short; spikelets few, in 1–3 terminal and axillary loose clusters, oblong, acute at both ends, 2″–3″ long; scales ovate-oblong, chestnut-brown, keeled, mucronate; bristles 6, slender, downwardly barbed, about equalling or becoming longer than the achene and tubercle; achene narrowly oblong, short-stalked, light brown, minutely wrinkled, lenticular; style 2-cleft; tubercle compressed, triangular-subulate, dark brown, about one-half as long as the achene.

In bogs, Vermont and Ontario to Minnesota, south to New Jersey, Pennsylvania and Michigan. July–Aug.

Rynchospora capillàcea laevisèta E. J. Hill, Am. Nat. 10: 370. 1876.
Bristles smooth. Northern Indiana and Michigan.

6. Rynchospora Knieskérnii Carey. Knieskern's Beaked-rush. (Fig. 653.)

Rhynchospora Knieskernii Carey, Am. Journ. Sci. (II.) 4: 25. 1847.

Culms slender, tufted, smooth, 8′–18′ tall. Leaves narrowly linear, flat, about ½″ wide, much shorter than the culm; spikelets numerous, in several distant compact clusters, oblong, acute, about 1″ long; scales chestnut-brown, ovate; bristles 6, downwardly barbed, equalling the achene; achene obovate, lenticular, brown, minutely wrinkled; style 2-cleft; tubercle triangular-subulate, pale, one-half as long as the achene or less and slightly decurrent on its edges.

Pine barrens, New Jersey to Virginia. July–Aug.

7. Rynchospora glomeràta (L.) Vahl. Clustered Beaked-rush. (Fig. 654.)

Schoenus glomeratus L. Sp. Pl. 44. 1753.
Rynchospora glomerata Vahl, Enum. 2: 234. 1806.

Rootstocks slender, culms smooth, triangular, slender or rather stout, 1°–3° high. Leaves flat, 1″–2″ wide, rough-margined, shorter than the culm; spikelets several or numerous, in 3–7 corymbose-capitate axillary rather loose clusters, oblong, narrowed at both ends, 1½″–2″ long; scales lanceolate, rich dark brown; bristles 6, downwardly barbed, longer than or equalling the achene and tubercle; achene obovate, lenticular, smooth, dark brown; tubercle subulate, about as long as the achene.

In moist soil, Maine to Ontario and Michigan, south to Florida and Texas. July–Sept.

Rynchospora glomeràta paniculàta (A. Gray) Chapm. Fl. S. States, 528. 1860.
Rhynchospora paniculata A. Gray, Ann. Lyc. N. Y. 3: 211. 1835.
Culm stouter, sometimes 4½° tall; leaves usually wider; spikelets very numerous in compound clusters. Maryland to Florida and Louisiana.

Rynchospora glomeràta minor Britton, Trans. N. Y. Acad. Sci. 11: 90. 1892.
Culms very slender, 5′–10′ tall; leaves ½″ wide or less; clusters 2 or 3, small, with 3–10 spikelets. Massachusetts and New Hampshire.

Rynchospora glomeràta discùtiens Clarke; Britton, Trans. N. Y. Acad. Sci. 11: 89. 1892.
Bristles smooth, or barbed at the apex only. New Jersey to North Carolina.

8. Rynchospora axillàris (Lam.) Britton. Capitate Beaked-rush. (Fig. 655.)

Schoenus axillaris Lam. Tabl. Encycl. 1: 137. 1791.
Rhynchospora cephalantha A. Gray, Ann. Lyc. N. Y. 3: 218. 1835.
Rhynchospora axillaris Britton, Bull. Torr. Club, 15: 104. 1888.

Culms stout, 3-angled, 2°–4° tall. Leaves flat, keeled, 1″–1½″ wide; spikelets spindle-shaped, 2½″–3″ long, exceedingly numerous, in several short-peduncled axillary and terminal very dense globose heads sometimes 10″ in diameter; scales dark brown, ovate-oblong, acute; bristles usually 6, longer than or equalling the achene and tubercle, downwardly or upwardly barbed; achene broadly obovate, brown, smooth, lenticular; tubercle subulate, about as long as the achene, somewhat decurrent on its edges.

In swamps, Long Island to Florida and Louisiana, near the coast. July–Sept.

Rynchospora axillàris microcéphala Britton, Trans. N. Y. Acad. Sci. 11: 89. 1892.
Heads only 4″–5″ in diameter; spikelets 1½″ long; achene one-half as large as that of the type. New Jersey to Florida and Louisiana.

9. Rynchospora fúsca (L.) R. & S. Brown Beaked-rush. (Fig. 656.)

Schoenus fuscus L. Sp. Pl. Ed. 2, 1664. 1763.
Rhynchospora fusca R. & S. Syst. 2: 88. 1817.

Rootstocks short, culms slender, 3-angled, smooth, tufted, 6′–18′ tall. Leaves setaceous, channeled, scarcely ½″ wide, much shorter than the culm; spikelets spindle-shaped, acute, about 2½″ long, several, or rather numerous, in 1–4 loose clusters; scales oblong-lanceolate, brown, shining, concave; bristles 6, upwardly barbed, often unequal, the longer ones usually exceeding the achene and tubercle; achene narrowly obovate, turgid-lenticular, smooth, shining; tubercle triangular-subulate, nearly as long as the achene, its margins serrulate or nearly smooth.

In bogs, New Brunswick to Delaware, west along the St. Lawrence and Great Lakes to Michigan. Also in Europe. July–Aug.

10. Rynchospora gracilénta A. Gray. Slender Beaked-rush. (Fig. 657.)

Rhynchospora gracilenta A. Gray, Ann. Lyc. N. Y. 3: 216. 1835.

Culms very slender or filiform, smooth, obtusely triangular, 1°–2° tall. Leaves flat or becoming involute in drying, rather less than 1″ wide, elongated but shorter than the culm; spikelets narrowly ovoid, acute, 2″ long, few, in 1–4 loose clusters, the lower clusters borne on filiform stalks; scales ovate, brown, mucronate; bristles 6, upwardly barbed, equalling the achene and tubercle; achene broadly oval or nearly orbicular, dark brown, lenticular, dull, smooth; tubercle narrowly subulate, flat, widened at the base, pale, about as long as the achene.

In pine barren swamps, New Jersey to Florida and Texas, near the coast. June–Aug.

11. Rynchospora cymòsa Ell. Grass-like Beaked-rush. (Fig. 658.)

Rhynchospora cymosa Ell. Bot. S. C. & Ga. 1: 58. 1816.
Schoenus cymosus Muhl. Gram. 8. 1817.

Light green, culms tufted, sharply 3-angled, smooth, 1°–2° tall. Leaves flat, narrowly linear, grass-like, 1½″–2″ wide or the basal ones broader, the uppermost sometimes overtopping the culm; spikelets ovoid-oblong, acute, 1½″ long, sessile or nearly so, capitate in 2's–7's on the ultimate branches of the axillary and terminal clusters; bracts setaceous; scales dark brown, broadly ovate or suborbicular; bristles 6, upwardly barbed, shorter than the achene; achene broadly obovate or oblong, lenticular, transversely wrinkled; style 2-cleft; tubercle conic, one-fourth to one-third as long as the achene.

In moist soil, New Jersey to Kentucky and Missouri, south to Florida and Texas. Also in Cuba. June–Aug.

12. Rynchospora Torreyàna A. Gray. Torrey's Beaked-rush. (Fig. 659.)

Rhynchospora Torreyana A. Gray, Ann. Lyc. N. Y. 3: 197. 1835.

Culms terete or obscurely 3-angled, smooth, slender, 1½°–3° tall. Leaves involute, the lower 1½″–2″ wide at the base and elongated, the upper bristle-like, distant; spikelets ovoid, 1½″ long, peduncled, numerous, in 1–4 loose distant clusters; scales brown, ovate, mucronate; bristles 6, upwardly barbed, shorter than the oblong-obovate transversely wrinkled lenticular achene; style 2-cleft; tubercle flat, conic, one-fourth to one-third as long as the achene.

In wet pine barrens, New Jersey to South Carolina. July–Aug.

13. Rynchospora inexpànsa (Michx.) Vahl. Nodding Beaked-rush. (Fig. 660.)

Schoenus inexpansus Michx. Fl. Bor. Am. 1: 35. 1803.
Rhynchospora inexpansa Vahl, Enum. 2: 232. 1806.

Rootstocks sleuder, culms tufted, smooth, slender, 3-angled, 2°–3° tall. Leaves smooth, 1″ wide or less, flat, the lower elongated, the upper bristle-like, remote; spikelets spindle-shaped, acute at both ends, about 3″ long, numerous, in 1–4 narrow finally drooping panicles; scales brown, lanceolate, acuminate; bristles 6, upwardly hispid, very slender, about twice as long as the achene; achene narrowly oblong, transversely wrinkled; style 2 cleft; tubercle flat, triangular-subulate, one-half as long as the achene.

Moist soil, Virginia to Louisiana. June–Aug.

15. CLÀDIUM P. Br. Civ. & Nat. Hist. Jam. 114. 1756.

Perennial leafy sedges, similar to the *Rynchosporas*, the spikelets oblong or fusiform, few-flowered, variously clustered. Scales imbricated all around, the lower empty, the middle ones mostly subtending imperfect flowers, the upper usually fertile. Perianth none. Stamens 2 or sometimes 3. Style 2–3-cleft, deciduous from the summit of the achene, its branches sometimes 2–3-parted. Achene ovoid or globose, smooth or longitudinally striate. Tubercle none. [Greek, referring to the branched inflorescence of some species.]

About 30 species, natives of tropical and temperate regions. Besides the following, another occurs in the southern United States and one in California.

1. Cladium mariscoides (Muhl.) Torr. Twig-rush. (Fig. 661.)

Schoenus mariscoides Muhl. Gram. 4. 1817.
Cladium mariscoides Torr. Ann. Lyc. N. Y. 3: 372. 1836.

Culm slender, erect, rather stiff, obscurely 3-angled, smooth, 1½°–3° tall. Leaves about 1″ wide, concave, with a long compressed tip, nearly smooth; umbels 2 or 3, compound, the 1 or 2 axillary, slender stalked; spikelets oblong, narrowed at both ends, acute, 2½″ long, capitate in 3's–10's on the raylets; scales chestnut-brown, ovate or ovate-lanceolate, acute, the midvein slightly excurrent; upper scale subtending a perfect flower with 2 stamens and a filiform 3-cleft style, the next lower one with 2 stamens and an abortive ovary; achene ovoid, acute, finely longitudinally striate, about 1″ long.

In marshes, Nova Scotia to Ontario and Minnesota, south to Florida and Iowa. July–Sept.

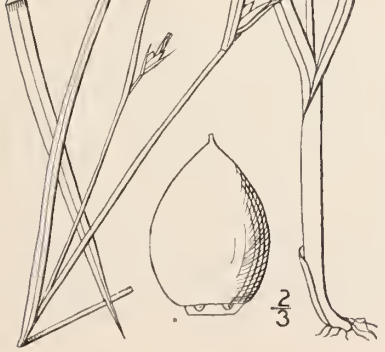
16. SCLÈRIA Berg, Kongl. Acad. Sv. Handl. 26: 142. *pl. 4, 5.* 1765.

Leafy sedges, mostly perennial by rootstocks, the spikelets small, clustered in terminal, or terminal and axillary fascicles, or sometimes interruptedly spicate. Flowers monoecious, the staminate and pistillate spikelets separated or borne in the same clusters. Fertile spikelets 1-flowered. Staminate spikelets many-flowered. Scales imbricated all around, the 1–3 lower and sometimes also the upper ones of the fertile spikelets empty. Periauth none. Style 3-cleft, slender or sometimes swollen at the base, deciduous. Ovary supported on a disk (hypogynium), or this wanting. Stamens 1–3. Achene globose or ovoid, obtuse, crustaceous or bony, white in our species. [Greek, in allusion to the hard fruit.]

About 100 species, natives of tropical and temperate regions. Besides the following, some 4 others occur in the southern United States.

Spikelets in terminal, or terminal and lateral clusters; achene supported on a hypogynium.
- Achene smooth.
  - Hypogynium supporting 8 or 9 small tubercles under the achene. — 1. *S. oligantha.*
  - Hypogynium covered with a rough white crust. — 2. *S. triglomerata.*
- Achene reticulated or irregularly rugose.
  - Culms erect or ascending; achene reticulated; leaves 1″–1½″ wide. — 3. *S. reticularis.*
  - Culms spreading; achene irregularly rugose; leaves 2″–4″ wide. — 4. *S. Torreyana.*
- Achene papillose. — 5. *S. pauciflora.*

Spikelets interruptedly glomerate-spicate; no hypogynium. — 6. *S. verticillata.*



1. Scleria oligántha Michx. Few-flowered Nut-rush. (Fig. 662.)

Scleria oligantha Michx. Fl. Bor. Am. 2: 167. 1803.

Rootstocks thick, hard, clustered. Culms slender, erect, sharply 3-angled, nearly smooth, 1½°–2½° tall, the angles somewhat winged. Leaves smooth or slightly rough at the apex, 2″–3″ wide, the lower short, acute, the upper elongated; clusters terminal, usually also 1 or 2 axillary, and filiform-stalked; bracts slightly ciliate or glabrous; achene ovoid, obtuse but sometimes pointed, bright white, smooth, shining; hypogynium a narrow obtusely triangular border supporting 8 or 9 small tubercles under the achene.

In moist soil, Virginia to Florida and Texas, near the coast. June–Aug.

2. Scleria triglomeràta Michx. Tall Nut-rush. (Fig. 663.)

Scleria triglomerata Michx. Fl. Bor. Am. 2: 168. 1803.

Rootstocks hard, short, clustered, culms 3-angled, slender or rather stout, erect or ascending, rough or nearly smooth on the angles, 1½°–3° tall. Leaves flat, smooth or slightly rough-margined, glabrous or nearly so, 1½″–2½″ wide, the lower short, acute, the upper tapering to a long tip, rarely exceeding the culm; flower-clusters terminal, and usually also 1 or 2 smaller ones from the axils; bracts glabrous or slightly ciliate; achene ovoid or ovoid globose, obtuse but somewhat pointed, bony, obscurely 3-angled, smooth, bright white, shining, about 1″ high, supported on a low obtusely triangular, papillose-crustaceous hypogynium.

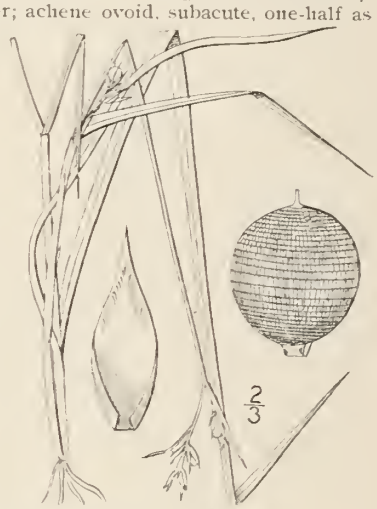
In meadows and thickets, Vermont to Wisconsin, south to Florida and Texas. July–Sept.

Scleria triglomerata minor Britton.

Scleria triglomerata var. *gracilis* Britton, Ann. N. Y. Acad. Sci. 3: 230. 1885. Not *S. gracilis* Ell. 1824.

Culms very slender, 1°–2° long; flower clusters smaller; achene ovoid, subacute, one-half as large as that of the type. Southern New Jersey.

3. Scleria reticulàris Michx. Reticulated Nut-rush. (Fig. 664.)



Scleria reticularis Michx. Fl. Bor. Am. 2: 167. 1803.

Rootstocks small, culms very slender, erect, 3-angled, 1°–2½° tall. Leaves narrowly linear, smooth, glabrous or nearly so, 1″–1½″ wide, not overtopping the culm; spikelets in a terminal cluster and 1–3 remote short-stalked axillary rather loose ones; bracts glabrous; achene globose, crustaceous, dull white when mature, reticulated by longitudinal and transverse ridges, ½″ in diameter, glabrous; hypogynium 3-lobed, its lobes appressed to the base of the achene.

In moist meadows, eastern Massachusetts to Florida, west to Missouri. Also in Cuba. July–Sept.

Scleria reticularis pubèscens Britton, Ann. N. Y. Acad. Sci. 3: 232. 1885.

Reticulations on the achene pubescent; lateral clusters usually longer stalked. New Jersey to Florida and Cuba.

Scleria reticularis obscùra Britton, Ann. N. Y. Acad. Sci. 3: 232. 1885.

Reticulations very obscure, the top of the achene almost smooth. Rhode Island to North Carolina.

4. Scleria Torreyàna Walp. Torrey's Nut-rush. (Fig. 665.)

Scleria Torreyana Walp. Ann. 3: 696. 1852–53.

Scleria laxa Torr. Ann. Lyc. N. Y. 3: 376. 1836. Not R. Br. 1810.

Culms weak but rather thick, spreading or diffuse, 3-angled, nearly or quite smooth, 1°–2½° long. Leaves linear, nearly flat, smooth, glabrous, 1½″–4″ wide, not exceeding the culm; spikelets in a loose terminal cluster, and 1–3 filiform-stalked smaller axillary ones; bracts glabrous; achene globose, somewhat pointed, nearly 1″ in diameter, irregularly rugose with low ridges somewhat spirally arranged, the ridges usually pubescent, and connected by shorter longitudinal ones, the surface thus indistinctly reticulated; hypogynium 3-lobed, the lobes appressed to the base of the achene.

In moist soil, southern New Jersey to Florida, Texas and Mexico. Also in Cuba. Forms of this species with obscurely reticulate achenes and narrow leaves are with difficulty separated from the preceding. June–Aug.

5. Scleria pauciflòra Muhl. Papillose Nut-rush. (Fig. 666.)

Scleria pauciflora Muhl.; Willd. Sp. Pl. 4: 318. 1805.

Rootstocks thick, hard, clustered, culms slender, rather stiff, erect, usually tufted, glabrous or sparingly pubescent, 3-angled, 9′–2° tall. Leaves very narrowly linear, erect, less than 1″ wide, the lower short, the upper elongated and often overtopping the culm, their sheaths often densely puberulent; spikelets in a small terminal cluster and sometimes also in 1 or 2 axillary short-stalked ones; bracts ciliate or glabrous; achene oblong or globular, ½″ in diameter or rather more, crustaceous, papillose, the lower papillae elongated and reflexed; hypogynium a narrow obtusely triangular border supporting 6 very small tubercles somewhat approximate in pairs.

In dry soil, New Hampshire to Ohio and Missouri, south to Florida and Texas. Also in Cuba. June–Sept.

6. Scleria verticillàta Muhl. Low Nut-rush. (Fig. 667.)

Scleria verticillata Muhl.; Willd. Sp. Pl. 4: 317. 1805.

Hypoporum verticillatum Nees, Linnaea, 9: 303. 1835.

Annual (?) roots fibrous, culms very slender or filiform, 3-angled, smooth or nearly so, erect, 4′–2° tall. Leaves very narrowly linear, ¼″–½″ wide, erect, shorter than the culm, the lower very short; sheaths sometimes pubescent; spikelets in several separated clusters, the inflorescence simple or sparingly branched; bracts bristle-like; scales glabrous; achene globose, ½″ in diameter, crustaceous, usually tipped with the base of the style, marked by sharp distinct transverse ridges, or somewhat reticulated by additional longitudinal ridges; hypogynium none.

In moist meadows, eastern Massachusetts to Ontario and Michigan, south to Florida, Texas and Mexico, and in the West Indies. Plant, especially the roots, fragrant in drying. July–Sept.

17. ELÝNA Schrad. Fl. Germ. 1: 155. 1806.

Low tufted arctic and mountain sedges, with erect slender mostly leafless culms, the narrowly linear leaves clustered at the base, and small 2-flowered spikelets in a narrow terminal cylindric spike. Scales of the spikelet 3 or 4, distinct, usually only one of them flower-bearing; the staminate flower of 3 stamens, the pistillate of a single pistil. Bristles or perianth wanting. Style slender, 3-cleft, not jointed to the oblong ovary. Achene obtusely 3-angled, sessile. [Greek, signifying *covering*, perhaps in allusion to the overlapping scales.]

Four or five species, the following occurring in the arctic and alpine regions of the northern hemisphere, the others in the mountains of Europe and Asia.

1. Elyna Bellàrdi (All.) C. Koch. Arctic Elyna. (Fig. 668.)

Carex Bellardi All. Fl. Ped. 2: 264. *pl. 92. f. 2.* 1785.
Kobresia scirpina Willd. Sp. Pl. 4: 205. 1805.
Elyna spicata Schrad. Fl. Germ. 1: 155. 1806.
Elyna Bellardi C. Koch, Linnaea, 21: 616. 1848.

Densely tufted, culms very slender, 4′–18′ tall, longer than the very narrow leaves. Old sheaths fibrillose, brown; margins of the leaves more or less revolute; spike subtended by a short bract, or bractless, densely flowered or sometimes interrupted below, 8″–15″ long, 1½″–2″ in diameter; achenes rather less than 1″ long, ½″ thick, appressed.

In arctic America from Greenland to Bering Sea, south in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

18. KOBRÈSIA Willd. Sp. Pl. 4: 205. 1805.

Slender arctic and mountain sedges, with erect culms leafy below, and few–several-flowered spikelets clustered in a terminal spike. Scales of the spikelets 1-flowered, the lower usually pistillate, and the upper staminate. Stamens 3. Perianth-bristles or perigynium wanting. Ovary oblong, narrowed into a short style; stigmas 3, linear. Achene obtusely 3-angled, sessile. [Name in honor of Von Kobres, a naturalist of Augsburg.]

Three or four species, the following widely distributed in arctic and mountainous regions, the others Himalayan.

1. Kobresia bipartìta (All.) Britton. Arctic Kobresia. (Fig. 669.)

Carex bipartita All. Fl. Ped. 2: 265. *pl. 89. f. 5.* 1785.
Kobresia caricina Willd. Sp. Pl. 4: 206. 1805.
Kobresia bipartita Britton, Mem. Torr. Club, 5: 101. 1894.

Culms solitary or tufted, smooth or very nearly so, 4′–12′ tall. Leaves about ½″ wide, infolded at least in drying, usually shorter than the culm, the old sheaths becoming fibrillose; spike 1′ long or less, composed of several or numerous linear appressed or ascending spikelets; scales somewhat serrulate on the keel, rather more than ½″ long; mature achenes slightly longer than the scales.

Greenland to the Canadian Rocky Mountains. Also in Europe and Asia. Summer.

19. UNCÍNIA Pers. Syn. 2: 534. 1807.

Culms erect, leafy, or the leaves all basal. Spike simple, erect, terminal, the scales imbricated, 1-flowered, the lower pistillate, the upper staminate. Scales ovate or oblong, concave, not keeled, obtuse or the lower acute. Stamens 3, rarely 1 or 2. Pistil enclosed in a utricle (perigynium), borne at the base of a slender axis, which is usually exserted beyond the orifice of the perigynium, at least in fruit, and sometimes hooked. Stigmas mostly 3. Achene 3-angled. [Latin, referring to the hooked projecting axis of the southern species.]

About 30 species, all but the following natives of the southern hemisphere. Our species differs from *Carex* only in the elongation of the subulate axis within the perigynium; those of the southern hemisphere are very different in habit.

1. Uncinia microglòchin (Wahl.) Spreng. Northern Uncinia. (Fig. 670.)

Carex microglochin Wahl. Kongl. Acad. Handl. (II.) 24: 140. 1803.
Carex oligantha Boott, Ill. 174. *pl. 589.* 1867.
Uncinia microglochin Spreng. Syst. 3: 830. 1826.

Perennial by short stolons, culms very slender, weak, 4′–12′ long. Leaves ½″–1″ wide, much shorter than the culm; spike 4″–8″ long, usually pistillate for more than one-half its length; scales oblong-lanceolate, 1-nerved, deciduous; perigynia very narrowly lanceolate, 3″–4″ long, less than ½″ thick, strongly reflexed in fruit; achene oblong, obtusely 3-angled, much shorter than the perigynium; axis of the pistillate flower bristle-like, long-exserted beyond the orifice of the perigynium.

Greenland to James Bay and British Columbia. Also in the arctic and mountainous parts of Europe and Asia and at the Strait of Magellan. Plant with the aspect of *Carex pauciflora*. Summer.

20. CÀREX L. Sp. Pl. 972. 1753.

Grass-like sedges, perennial by rootstocks. Culms mostly 3-angled. Leaves 3-ranked, the upper elongated or very short (bracts) and subtending the spikes of flowers, or wanting. Flowers monoecious or dioecious, solitary in the axils of bracts (scales). Spikes either wholly pistillate, wholly staminate, or bearing both staminate and pistillate flowers (androgynous). Perianth none Staminate flowers of 3 stamens, the filaments filiform. Pistillate flowers of a single pistil with a style and 2 or 3 stigmas, borne on a very short axis in the axil of a sac-like bractlet or second bract called the perigynium (utricle), which completely encloses the achene. Achene 3-angled, lenticular or plano-convex.

A vast genus, of more than 1000 species, widely distributed, most abundant in the temperate zones. Besides the following about an equal number occur in the western and southern parts of North America. Specimens can only be satisfactorily determined when nearly or quite mature. The genus is divided into the two subgenera, EUCAREX (nos. 1–142) and VIGNEA (nos. 143–205).

I. Staminate flowers numerous, in one or more terminal spikes, which are sometimes pistillate at the base or summit; or the spike solitary and the staminate flowers uppermost or basal, rarely dioecious; stigmas mostly 3 and the achene 3-angled or swollen (stigmas 2 and the achene lenticular or compressed in nos. 12–16; 49–59; 67–72); pistillate spikes stalked or sessile, the lower commonly stalked. Nos. 1–142. EUCAREX.

A. PERIGYNIA MOSTLY LONG-BEAKED, 1½″–10″ LONG, OFTEN INFLATED, THE BEAK USUALLY AS LONG AS THE BODY OR LONGER (SHORT-BEAKED IN NOS. 11–16, 34 AND 35); PISTILLATE SPIKES MOSTLY LARGE (SMALL IN NOS. 1, 13 AND 14), GLOBOSE, OVOID, OBLONG OR CYLINDRIC. NOS. 1–35.

(a) *Perigynia membranous or papery.* Nos. 1–31.

1. Spike solitary, few-flowered, staminate above; perigynia strongly reflexed, subulate. PAUCIFLORAE. 1. *C. pauciflora.*
2. Spikes normally several, the staminate uppermost; if solitary, staminate at the base. (See no. 30.) Nos. 2–31.

* **Perigynia ovoid, conic with a narrowed base, or subulate, tapering into the beak.** Nos. 2–28.

† Teeth of the perigynium-beak slender, short or none; not stiff nor awned. Nos. 2–24.

‡ Teeth of the perigynium-beak lanceolate or subulate. Nos. 2–10. LUPULINAE.

Pistillate spikes ovoid or globose, few–many-flowered.
- Perigynia subulate, reflexed when mature. 2. *C. Collinsii.*
- Perigynia conic or ovoid, not reflexed.
  - Plants yellow or yellowish; perigynia little inflated.
    - Leaves 1″–2″ wide; staminate spikes sessile. 3. *C. abacta.*
    - Leaves 2″–6″ wide; staminate spike mostly stalked. 4. *C. folliculata.*
  - Plants green; perigynia much inflated; staminate spike stalked.
    - Leaves 2″–3″ wide; heads loosely flowered. 5. *C. intumescens.*
    - Leaves 3″–5″ wide; heads globose, dense. 6. *C. Asa-Grayi.*

Pistillate spikes oblong or cylindric, densely many-flowered.
- Pistillate spikes oblong; achene longer than thick.
  - Perigynia strongly several-nerved, shining; leaves 1″–2″ wide. 7. *C. Louisianica.*
  - Perigynia many-nerved, dull; leaves 2″–5″ wide. 8. *C. lupulina.*
- Pistillate spikes cylindric; achene not longer than thick.
  - Perigynia yellowish, tapering into a beak twice as long as the body. 9. *C. lupuliformis.*
  - Perigynia greenish-brown, abruptly narrowed into a beak 2–3 times as long as the body. 10. *C. grandis.*

‡‡ Teeth of the perigynium-beak short or almost wanting (long in no. 17) nos. 11–24. VESICARIAE.

Spikes small, 1′ long or less, oblong or subglobose; stigmas often 2.
Spikes green or greenish yellow.
Leaves involute; perigynia ovoid; pistillate spikes few-several-flowered. 11. *C. oligosperma.*
Leaves flat; perigynia oblong-elliptic; pistillate spikes many-flowered. 12. *C. Raeana.*
Spikes dark brown or purple; arctic species.
Leaves flat.
Perigynia little inflated, papery.
Beak of perigynium nearly or quite entire. 13. *C. miliaris.*
Beak of perigynium sharply and minutely 2-toothed. 14. *C. saxatilis.*
Perigynia much inflated, very fragile. 15. *C. membranopacta.*
Leaves involute when dry. 16. *C. ambusta.*
Spikes large, 1′–6′ long, cylindric or oblong-cylindric; stigmas 3.
Scales acute, acuminate or smooth-awned, or the lower slightly roughened.
Perigynia ascending or spreading, not reflexed.
Spikes narrowly cylindric, 1′–6′ long, 3″–4″ thick.
Leaves 2″–6″ wide; culm stout. 17. *C. utriculata.*
Leaves 1″–2½″ wide; culm slender. 18. *C. monile.*
Spikes cylindric or oblong cylindric, 1′–2′ long, 6″ thick.
Scales smooth-awned. 19. *C. Tuckermani.*
Scales acute, acuminate or the upper obtuse. 20. *C. bullata.*
Perigynia, at least the lower ones, reflexed when mature.
Spikes all clustered at the summit or the lower 1 or 2 separated; perigynia all reflexed when old. 21. *C. retrorsa.*
Spikes scattered; only the lower perigynia reflexed. 22. *C. Hartii.*
Scales tapering into rough awns, or subulate and scabrous.
Spikes cylindric, about 6″ thick; perigynia tapering into the beak. 23. *C. lurida.*
Spikes narrowly cylindric, 3″–4″ thick; perigynia abruptly narrowed into the beak. 24. *C. Baileyi.*

†† Teeth of the perigynium-beak stiff; setaceous or awned. Nos. 25–28. PSEUDOCYPERAE.

Spikes all erect or ascending. 25. *C. Schweinitzii.*
Spikes, at least the lower ones, slender-stalked and drooping.
Pistillate spikes oblong-cylindric, ½′–2′ long; perigynia ascending. 26. *C. hystricina.*
Pistillate spikes narrowly cylindric, 1′–2½′ long; perigynia reflexed.
Teeth of the beak erect or little spreading. 27. *C. Pseudo-cyperus.*
Teeth of the beak recurved-spreading. 28. *C. comosa.*

** Perigynia obovoid, very abruptly contracted into the beak; spikes exceedingly dense. Nos. 29–31. SQUARROSAE.

Scales linear-subulate, longer than the perigynia. 29. *C. Frankii.*
Scales lanceolate, about one-half as long as the perigynia.
Spikes 1–3, subglobose or oval, staminate below; achene linear-oblong. 30. *C. squarrosa.*
Spikes 2–6, oblong-cylindric, usually staminate at both ends; achene ovoid. 31. *C. typhinoides.*

(b) *Perigynia firm, hard or leathery.* Nos. 32–35. PALUDOSAE.

Leaves bright green, not glaucous; teeth of the perigynium-beak slender, conspicuous.
Scales lanceolate, acute or acuminate; leaves glabrous. 32. *C. trichocarpa.*
Scales ovate-lanceolate, rough-awned; leaves often pubescent. 33. *C. aristata.*
Leaves pale green, glaucous; teeth of the perigynium-beak short.
Pistillate spikes about 4″ thick; teeth of the perigynium-beak manifest. 34. *C. riparia.*
Pistillate spikes about 2″ thick; teeth of the perigynium-beak minute. 35. *C. acutiformis.*

B. PERIGYNIA SHORT-BEAKED OR BEAKLESS, LITTLE OR NOT AT ALL INFLATED, ½″–2½″ LONG, THE BEAK COMMONLY NOT MORE THAN ONE-HALF AS LONG AS THE BODY (LONG-BEAKED IN NOS. 43, 82, 83, 96); SPIKES SMALL, AND OBLONG OR GLOBOSE; OR ELONGATED, LINEAR OR NARROWLY CYLINDRIC. NOS. 36–142.

(a) *Spikes 2 or more, the staminate one always uppermost, sometimes partly pistillate.* (No. 140 may be looked for here). Nos. 36–132.

1. Pistillate spike or spikes many-flowered, mostly 1′ long or more (or shorter in nos. 44, 48, 53–55, 61, 63–65, 73, 75, 76, 85, 89–92), linear, narrowly cylindric or oblong. Nos. 36–92.

* Perigynia with a straight short beak (long-beaked in no. 43; nearly beakless in no. 36), firm or leathery in texture; pistillate spikes erect (or nodding in no. 37); stigmas 3. Nos. 36–43.

Uppermost spike staminate from the base to about the middle. SHORTIANAE. 36. *C. Shortiana.*
Upper one or more spikes entirely staminate, or occasionally pistillate at the base.
Perigynia papillose; beak very short, nearly or quite entire. ANOMALAE. 37. *C. scabrata.*
Perigynia pubescent (sometimes glabrous in no. 39), the beak sharply 2-toothed. HIRTAE.
Staminate spike or spikes sessile or nearly so. 38. *C. vestita.*
Staminate spike or spikes distinctly stalked.
Leaves glabrous; native species.
Leaves flat or their margins slightly revolute.
Scales only half as long as the perigynia; southern coast species. 39. *C. Walteriana.*
Scales equalling or but slightly shorter than the perigynia; northern species.
Leaves 2″–3½″ wide; perigynia 1½″ thick, the nerves prominent, 40. *C. Houghtonii.*
Leaves 1″–2″ wide; perigynia 1″ thick, the nerves obscured by the dense pubescence. 41. *C. lanuginosa.*
Leaves strongly involute, 1″ wide or less. 42. *C. filiformis.*
Leaves or their sheaths pubescent; introduced species; beak long. 43. *C. hirta.*

** **Perigynia beakless or very short-beaked (see no. 36), and with orifices nearly or quite entire, thin in texture, not inflated, closely investing the achene; pistillate spikes erect or drooping, often brown or purple; stigmas often 2.** Nos. 44–72.

† Pistillate spikes erect or somewhat spreading (drooping when mature in no. 45). Nos. 44–58.

Terminal spike staminate below, pistillate above (rarely all staminate in no. 47); stigmas 3. ATRATAE.
- Scales shorter than or equalling the perigynia; arctic and alpine species.
  - Orifice of the perigynium minutely 2-toothed; scales obtuse or acutish.
    - Pistillate spikes 2″–5″ long, erect. 44. *C. alpina.*
    - Pistillate spikes 4″–12″ long, drooping when old. 45. *C. atratiformis.*
  - Orifice of the perigynium entire; scales acute or awned.
    - Perigynium ovate, the style usually protruding. 46. *C. stylosa.*
    - Perigynium obovate, the style not protruding. 47. *C. Parryana.*
- Scales manifestly longer than the perigynia: bog species. 48. *C. fusca.*

Terminal spike staminate throughout (occasionally pistillate at the top in no. 53); stigmas 2, rarely 3 in No. 55. RIGIDAE.
- Lower sheaths becoming very fibrillose; tufted bog species. 49. *C. stricta.*
- Lower sheaths not at all fibrillose, or slightly so.
  - Scales shorter than or equalling the perigynia (or longer in no. 50).
    - Culms 1°–2½° tall; scales acute or acuminate.
      - Pistillate spikes linear-cylindric. 50. *C. Haydeni.*
      - Pistillate spikes oblong-cylindric. 51. *C. Nebraskensis.*
    - Culms 8′–4° tall; scales obtuse or the lower acute.
      - Scales green.
        - Leaves 2″–3″ wide; pistillate spikes 2″–3″ thick; perigynia nerveless. 52. *C. aquatilis.*
        - Leaves 1″ wide; pistillate spikes 1″–2″ thick; perigynia faintly few-nerved. 53. *C. lenticularis.*
      - Scales purple or brown.
        - Scales shorter than the perigynia; marsh and meadow species. 54. *C. Goodenovii.*
        - Scales equalling or longer than the perigynia; arctic and alpine species. 55. *C. Bigelovii.*
    - Culms only 1′–7′ tall; arctic species. 56. *C. subspathacea.*
  - Scales distinctly longer than the perigynia; northern salt marsh species.
    - Basal leaves 1″ wide or less; scales little longer than the perigynia. 57. *C. salina.*
    - Basal leaves 1″–3″ wide; scales much longer than the perigynia. 58. *C. cuspidata.*

†† Pistillate spikes drooping, mostly on slender or filiform stalks (erect in nos. 66 and 71.) Nos. 59–72

Culms slender; pistillate spikes ¼′–2½′ long; stigmas 3 (2 in no. 59).
- Pistillate spikes linear; scales shorter than the perigynia. PRASINAE.
  - Perigynia twisted toward the top; scales purple-brown. 59. *C. torta.*
  - Perigynia straight; scales green. 60. *C. prasina.*
- Pistillate spikes oblong, globose or cylindric; scales equalling the perigynia or longer.
  - Bracts manifestly sheathing; arctic species. FERRUGINEAE. 61. *C. misandra.*
  - Bracts sheathless; scales mostly dark. PENDULINAE.
    - Pistillate spikes narrowly cylindric; southern coast species. 62. *C. littoralis.*
    - Pistillate spikes oblong or globose; northern species.
      - Scales not longer than the perigynia.
        - Pistillate spikes 3″–6″ long, few-flowered; scales obtuse. 63. *C. rariflora.*
        - Pistillate spikes 5″–10″ long, several-flowered; scales acute. 64. *C. limosa.*
      - Scales distinctly longer than the perigynia.
        - Perigynia oval or suborbicular. 65. *C. Magellanica.*
        - Perigynia elliptic-lanceolate. 66. *C. podocarpa.*

Culms tall, usually stout; pistillate spikes 1′–4′ long; scales 1–8 times as long as the perigynia; stigmas 2 (or 3 in nos. 70 and 71). CRYPTOCARPAE.
- Perigynia smooth.
  - Scales purple-brown; arctic species. 67. *C. cryptocarpa.*
  - Scales green; plants not arctic.
    - Perigynia nerveless or faintly nerved, much shorter than the scales.
      - Perigynia nearly orbicular, biconvex. 68. *C. maritima.*
      - Perigynia obovoid, obtuse. 69. *C. crinita.*
      - Perigynia oblong or elliptic, acute. 70. *C. gynandra.*
    - Perigynia strongly several-nerved, about equalling the scales. 71. *C. macrokolea.*
- Perigynia granular or papillose. 72. *C. glauca.*

*** **Perigynia tapering to a distinct beak (nearly or quite beakless in nos 73-77), membranous in texture (firm in no. 88), inflated or loosely investing the achene; pistillate spikes mostly drooping, often narrowly linear.** Nos. 73–92.

† Terminal spike staminate below, pistillate above; beak of the perigynium short or none. Nos. 73–81.

‡ Spikes all erect or nearly so. VIRESCENTES.

Perigynium densely pubescent.
- Pistillate spikes oblong-cylindric, 4″–10″ long; perigynia oval or ovoid, few-nerved. 73. *C. virescens.*
- Pistillate spikes narrowly cylindric, 6″–18″ long; perigynia oblong, strongly several-nerved. 74. *C. costellata.*

Perigynium nearly glabrous, at least when mature.
- Spikes 2½″–3½″ thick; perigynia imbricated, flattened; top of the achene not bent. 75. *C. triceps.*
- Spikes 2″ thick; perigynia not imbricated, swollen; top of the achene bent, or tipped with a bent style. 76. *C. Caroliniana.*

‡‡ Pistillate spikes drooping or spreading (erect or little spreading in no. 78). GRACILLIMAE.

Perigynia 1″–2″ long, slightly swollen; spikes linear or linear-cylindric.
Plant glabrous; perigynia obtuse. 77. *C. gracillima.*
Sheaths pubescent; perigynia pointed at both ends.
Perigynia 1″ long; spikes erect or somewhat spreading. 78. *C. aestivalis.*
Perigynia 2″ long; spikes drooping, at least when old. 79. *C. oxylepis.*
Perigynia 2″–2½″ long, manifestly swollen; spikes oblong or oblong-cylindric.
Perigynia faintly few-nerved; scales ovate, acute or short-awned. 80. *C. formosa.*
Perigynia strongly many-nerved; scales lanceolate, long-awned. 81. *C. Davisii.*

†† Terminal spike entirely staminate, or sometimes pistillate at the base. Nos. 82–92. (See no. 140.)

Perigynia manifestly beaked, nerved or nerveless; pistillate spikes drooping, at least when old.
Beak of the perigynium cylindric or subulate, 1–2 times as long as the body. SYLVATICAE.
Perigynia broadly oval, smooth, spreading. 82. *C. longirostris.*
Perigynia narrowly conic, tuberculate-hispid, appressed. 83. *C. Assiniboinensis.*
Beak of the perigynium not more than one-half as long as the body.
Leaves pubescent. FLEXILES. 84. *C. castanea.*
Leaves glabrous.
Pistillate spikes narrowly oblong, 2″–6″ long; perigynium 1″ long; arctic and alpine species. CAPILLARES. 85. *C. capillaris.*
Pistillate spikes linear, 1′–3′ long; perigynium 2″–3″ long. DEBILES.
Perigynia membranous, few-nerved; pistillate spikes slender.
Leaves 2½″–5″ wide; scales two-thirds as long as the perigynia. 86. *C. arctata.*
Leaves 1″–2½″ wide; scales one-half as long as the perigynia. 87. *C. tenuis.*
Perigynia coriaceous, strongly many-nerved; pistillate spikes thicker. 88. *C. oblita.*
Perigynia beakless or minutely beaked, finely many-striate; spikes erect or nearly so. GRISEAE.
Leaves slightly or not at all glaucous.
Perigynia little longer or shorter than the scales.
Pistillate spikes dense, usually many-flowered; leaves 2″–3″ wide, spreading, soft. 89. *C. grisea.*
Pistillate spikes loosely several-flowered; leaves 1″–2″ wide, mostly erect and rigid. 90. *C. amphibola.*
Perigynia 2–3 times longer than the scales. 91. *C. flaccosperma.*
Plant very glaucous all over. 92. *C. glaucodea.*

2. Pistillate spikes small, few–many-flowered, mostly 3″–12″ long (sometimes longer in nos. 103, 104, 116). Nos. 93–132. (See also nos. 44, 48, 53–55, 61, 63–65, 68, 73, 75, 80, 84, 85 and 89–92.)

* **Perigynia glabrous.** Nos. 93–120. (See no. 123.)

† Pistillate spikes many-flowered, ¼′–1′ long, usually dense. Nos. 93–99.

Pistillate spikes scattered, distant, long-stalked or the 2 upper ones close together and nearly sessile. GRANULARES.
Bracts elongated, mostly overtopping the spikes; perigynia strongly many-nerved. 93. *C. granularis.*
Bracts short, rarely overtopping the spikes; perigynia obscurely few-nerved. 94. *C. Crawei.*
Pistillate spikes close together and nearly sessile at the summit of the culm, or the lowest distant and stalked.
Beak of the perigynium stout, 2-toothed; plants glabrous. EXTENSAE.
Leaves strongly involute; perigynia brown, the beak shorter than the body. 95. *C. extensa.*
Leaves flat, 1″–2½″ wide; perigynia yellow when mature, 2″–3″ long, the beak about as long as the body. 96. *C. flava.*
Leaves flat, 1″ wide or less; perigynia dark green, 1″ long, the beak one-half as long as the body. 97. *C. viridula.*
Beak of the perigynium short, entire or none; leaves, or their sheaths, more or less pubescent. PALLESCENTES.
Perigynia faintly few-nerved, beakless. 98. *C. pallescens.*
Perigynia strongly many-nerved, cylindric-beaked. 99. *C. abbreviata.*

†† Pistillate spikes few–several-flowered, often loose. Nos. 100–120; 136–138.

‡ Scales of the spike normal, not elongated and leaf-like. Nos. 100–120.

⅔ Leaves 1″–18″ wide; bracts leafy, usually large. Nos. 100–119.

○ Perigynia green (yellow or purple in no. 116). Nos. 100–117.

Perigynia finely many-striate. OLIGOCARPAE.
Sheaths glabrous.
Perigynia narrowed at both ends, beakless. 100. *C. conoidea.*
Perigynia with a short entire beak. 101. *C. oligocarpa.*
Sheaths pubescent. 102. *C. Hitchcockiana.*
Perigynia with few or many, mostly strong nerves. LAXIFLORAE.
Plants not at all glaucous, or very slightly so.
Beak of the perigynium straight, slender.
Culms slender, spreading; pistillate spikes 2 or 3, stalked, spreading. 103. *C. altocaulis.*
Culms stout, erect; pistillate spikes 1 or 2, erect. 104. *C. polymorpha.*
Beak of the perigynium bent, short or none.
Leaves mostly narrow, 1″–6″ wide.
Scales, at least the upper, obtuse.
Bracts elongated; spikes loosely flowered; culms slender. 105. *C. tetanica.*
Bracts short; spikes densely flowered; culms stout. 106. *C. Meadii.*

Scales acute, cuspidate, acuminate, or awned.
Perigynia obtusely 3-angled.
Perigynia obovoid, 1¼″–1½″ long. 107. *C. laxiflora.*
Perigynia oblong, narrow, about 2″ long. 108. *C. styloflexa.*
Perigynia sharply 3-angled.
Spikes drooping or spreading; leaves 1″–2″ wide, or wider in the variety. 109. *C. digitalis.*
Spikes erect; leaves 3″–6″ wide. 110. *C. Careyana.*
Leaves broad, 6″–18″ wide.
Bracts leafy, the upper usually overtopping the spikes. 111. *C. Albursina.*
Bracts mostly reduced to purple leafless sheaths. 112. *C. plantaginea.*
Plants distinctly glaucous.
Pistillate spikes drooping on hair-like stalks. 113. *C. laviculmis.*
Pistillate spikes erect.
Basal leaves much longer than the culm. 114. *C. ptychocarpa.*
Basal leaves shorter than the culm or equalling it.
Leaves 6″–12″ wide. 115. *C. platyphylla.*
Leaves 1″–2″ wide.
Scales acute; perigynia yellow, purple or mottled. 116. *C. panicea.*
Scales obtuse, or the lower acute; perigynia pale green. 117. *C. livida.*

○○ Perigynia white, yellow or becoming brown. BICOLORES.

Perigynia beakless. 118. *C. aurea.*
Perigynia with a short cylindric beak; arctic species. 119. *C. bicolor.*

⁂ Leaves and culms almost capillary; bracts reduced to bladeless sheaths. DIGITATAE. 120. *C. setifolia.*

‡‡ Scales of the spikes leaf-like, elongated. PHYLLOSTACHYAE.

Lower scales 1″ wide or less, not concealing the perigynia.
Body of the perigynium oblong; beak flattened. 136. *C. Willdenovii.*
Body of the perigynium globose; beak subulate. 137. *C. Jamesii.*
Lower scales 1″–2″ wide, concealing the perigynia. 138. *C. durifolia.*

** Perigynia more or less pubescent (becoming glabrous in no. 123). Nos. 121–132.

Culm-leaves present, often short; bracts mainly reduced to bladeless purplish sheaths. PEDUNCULATAE.
Staminate spike short-stalked or sessile.
Perigynia about twice as long as the scales. 121. *C. concinna.*
Perigynia not longer than the scales. 122. *C. Richardsoni.*
Staminate spike long-stalked, commonly with some pistillate flowers at its base. 123. *C. pedunculata.*
Leaves all basal; bracts short or long, not sheathing.
Neither the culm nor the leaves pubescent; perigynia rounded. MONTANAE.
Plant not stoloniferous. 124. *C. pedicellata.*
Plants stoloniferous, the stolons sometimes short.
Culms, or some of them, longer than the leaves.
Scales smooth or very nearly so.
Staminate spike conspicuous, 3″–9″ long.
Staminate spike stout, ½″–1½″ thick.
Plant dark green; staminate spike very prominent; perigynia broadly oval. 125. *C. Pennsylvanica.*
Plant light green; staminate spike shorter; perigynia oblong. 126. *C. varia.*
Staminate spike very slender, not over ½″ thick. 127. *C. Novae-Angliae.*
Staminate spike inconspicuous, rarely over 2″ long (longer in the variety.) 128. *C. deflexa.*
Scales, at least the lower, rough-awned. 129. *C. praecox.*
Culms, or most of them, much shorter than the leaves.
Scales light green with purple margins; perigynia oblong. 130. *C. nigromarginata.*
Scales green with lighter scarious margins; perigynia oval. 131. *C. umbellata.*
Plant pubescent all over; perigynia sharply 3-angled. TRIQUETRAE. 132. *C. pubescens.*

(**b**) *Spike solitary (except in no. 140), sometimes dioecious.* Nos. 133–142.

Leaves 1′–2′ wide, thick, spreading. PHYSOCEPHALAE. 133. *C. Fraseri.*
Leaves ¼″–3″ wide.
Staminate and pistillate spikes on different culms. SCIRPINAE.
Leaves longer than the culm; perigynia obovoid; southern species. 134. *C. picta.*
Leaves shorter than the culm; perigynia oval; northern species. 135. *C. scirpoidea.*
Staminate and pistillate flowers in the same spike.
Scales of the spike leaf-like, elongated. PHYLLOSTACHYAE.
Lower scales 1″ wide or less, not enclosing the perigynia.
Body of the perigynium oblong, its beak flattened. 136. *C. Willdenovii.*
Body of the perigynium globose, its beak subulate. 137. *C. Jamesii.*
Lower scales 1″–2½″ wide, enclosing the perigynia. 138. *C. durifolia.*
Scales of the spike short, normal.
Leaves ½″–1″ wide; arctic and western species. RUPESTRES.
Spike solitary, androgynous; perigynium-beak stout, long. 139. *C. rupestris.*
Spikes 2–4, the staminate uppermost; perigynium-beak short. 140. *C. supina.*
Leaves ¼″ wide or less.
Perigynia obtuse, beakless; swamp species. LEPTOCEPHALAE. 141. *C. leptalea.*
Perigynia obovoid-oval, beaked; prairie species. FILIFOLIAE. 142. *C. filifolia.*

II. Staminate flowers few, at the summits or bases of the always sessile spikes, or sometimes forming whole spikes, or variously intermixed with the pistillate; stigmas always 2; achene lenticular, compressed, ellipsoid or plano-convex. Nos. 143–205. VIGNEA.

I. Staminate flowers at the summits of the spikes. Nos. 143–173.

(a) *Spike solitary, terminal, mostly brown, plants often dioecious.* Nos. 143–146. Dioicae.

Perigynia nerveless, or faintly few-nerved.
- Perigynia with a short nearly entire beak. 143. *C. capitata.*
- Perigynia beakless, the orifice 2-toothed. 144. *C. nardina.*

Perigynia strongly several-nerved on the outer face.
- Beak of the perigynium very short. 145. *C. Redowskyana.*
- Beak slender, rough, about half as long as the body of the perigynium. 146. *C. exilis.*

(b) *Spikes several or many, clustered, separated or sometimes panicled.* Nos. 147–151.

* Spikes densely aggregated into a globose or ovoid head, often appearing like a solitary terminal spike.

Scales ovate or ovate-lanceolate, acute or acuminate, not awned. Foetidae.
- Perigynia strongly many-nerved. 147. *C. chordorhiza.*
- Perigynia faintly several-nerved.
  - Culms and leaves usually curved; scales shorter than the perigynia. 148. *C. incurva.*
  - Culms mostly straight, erect; scales equalling the perigynia. 149. *C. stenophylla.*

Scales lanceolate, awned, or long-acuminate. Arenariae.
- Scales 2–4 times longer than the perigynia; western species. 150. *C. Douglasii.*
- Scales about equalling the perigynia; introduced sea-coast species. 151. *C. arenaria.*

** Clusters of spikes looser, often compound or the spikes distinctly separated (more or less aggregated in nos. 170–173). Nos. 152–173.

† Spikes yellowish or brown at maturity, often in compound or panicled clusters. Nos. 152–163.

Perigynia strongly several-nerved, especially on the outer face. Nos. 152–154. Vulpinae.
- Beak of the perigynium shorter than the body. 152. *C. conjuncta.*
- Beak of the perigynium equalling or longer than the body.
  - Spikes crowded in an oblong cluster; beak 1–2 lengths of the body. 153. *C. stipata.*
  - Spikes in a large branching cluster; beak 3–4 lengths of the body. 154. *C. Crus-corvi.*

Perigynia nerveless or faintly nerved. Nos. 155–163. Multiflorae.
- Spikes very numerous in a branched decompound cluster, small. 155. *C. decomposita.*
- Spikes several or many in an oblong or narrow, simple or somewhat compound cluster.
  - Leaves 1″ wide or less.
    - Beak of the perigynium shorter than the body; western species. 156. *C. marcida.*
    - Beak as long as the body; northern marsh species. 157. *C. tetetiuscula.*
  - Leaves 1″–3″ wide.
    - Scales acuminate, cuspidate or awned.
      - Perigynia 1½″–2½″ long.
        - Perigynia ovate or ovate-lanceolate, the beak about as long as the body. 158. *C. alopecoidea.*
        - Perigynia broadly ovate or orbicular, the beak about one-third as long as the body. 159. *C. gravida.*
      - Perigynia 1½″ long or less.
        - Leaves as long as the culm or longer. 160. *C. vulpinoidea.*
        - Leaves shorter than the culm.
          - Perigynia ovate-elliptic, the base narrowed. 161. *C. xanthocarpa.*
          - Perigynia lanceolate, the base truncate. 162. *C. setacea.*
    - Scales blunt, scarious-tipped. 163. *C. Sartwellii.*

†† Spikes green or greenish when mature, aggregated or separated, in simple clusters. Nos. 164–173. Muhlenbergianae.

Perigynia ellipsoid, nearly terete; spikes 1–5-flowered, widely separated, or the upper close together. 164. *C. teuella.*

Perigynia lanceolate, ovate or roundish, compressed or plano-convex; spikes several–many-flowered.
- Spikes separated or the upper close together; perigynia mostly radiating, or reflexed.
  - Leaves ½″–1½″ wide.
    - Beak of the perigynium one-third to one-half as long as the body; native woodland species.
      - Perigynia ovate-lanceolate, 1″–1½″ long.
        - Perigynia stellately radiating. 165. *C. rosea.*
        - Perigynia reflexed when mature. 166. *C. retroflexa.*
      - Perigynia narrowly lanceolate, 1½″–2″ long. 167. *C. Texensis.*
    - Beak of the perigynium more than half as long as the body; introduced field species. 168. *C. muricata.*
  - Leaves 2½″–4½″ wide. 169. *C. sparganioides.*
- Spikes all aggregated or the lower separated; perigynia spreading or ascending.
  - Leaves thin, lax, 2″–4″ wide; perigynia about 2″ long. 170. *C. cephaloidea.*
  - Leaves stiffer, ½″–2″ wide.
    - Perigynia 1″ long or less, nerveless or faintly few-nerved.
      - Leaves 1″–2″ wide; perigynia ovate. 171. *C. cephalophora.*
      - Leaves ½″–1″ wide; perigynia orbicular-ovate; southern. 172. *C. Leavenworthii.*
    - Perigynia 1½″ long, strongly nerved (except in var. *Xalapensis*). 173. *C. Muhlenbergii.*

2. Staminate flowers variously mingled with the pistillate in the spikes or occasionally forming whole spikes. (See nos. 143–146.)

Perigynia radiately spreading or reflexed. 174. *C. sterilis.*
Perigynia erect or appressed.
Perigynia wingless, the inner face flat. 187. *C. bromoides.*
Perigynia winged, the inner face concave. 190. *C. siccata.*

3. Staminate flowers at the bases of the spikes. Nos. 174–205.

(**a**) *Perigynia without a marginal wing.* Nos. 174–187. Elongatae.

Perigynia radiately spreading, or reflexed when old.
Perigynia distinctly nerved on both faces, the beak rough.
Perigynia lanceolate; beak more than half as long as the body. 174. *C. sterilis.*
Perigynia ovate; beak about one-third as long as the body, abrupt. 175. *C. Atlantica.*
Perigynia faintly nerved on the outer face, nerveless or nearly so on the inner; beak smoothish. 176. *C. interior.*
Perigynia ascending, appressed or somewhat spreading when old, not radiating.
Perigynia ovate, oval, oblong or elliptic.
Bracts short, scale-like or none, the lowest occasionally longer than its spike.
Spikes distinctly separated or the upper close together.
Heads silvery green or nearly white. 177. *C. canescens.*
Heads brown or brownish.
Spikes few-flowered, 2″–3″ long; perigynia less than 1″ long, the beak manifest. 178. *C. brunnescens.*
Spikes dense, many-flowered; perigynia about 1″ long, the beak very short. 179. *C. Norvegica.*
Spikes densely clustered at the top of the culm, or the lower separated.
Spikes green or greenish brown.
Spikes several in an ovoid cluster; perigynia ovate, rough-beaked. 180. *C. arcta.*
Spikes only 2–4; perigynia elliptic, beakless. 181. *C. tenuiflora.*
Spikes dark brown; arctic species.
Culms slender, stiff, erect.
Leaves involute; scales about equalling the perigynia. 182. *C. Heleonastes.*
Leaves flat; scales shorter than the perigynia. 183. *C. lagopina.*
Culms weak, spreading or reclining. 184. *C. glareosa.*
Bracts bristle-form, much elongated, much exceeding the 2–4 oblong nerved perigynia. 185. *C. trisperma.*
Perigynia lanceolate or ovate-lanceolate.
Perigynia nerveless; spikes oblong or subglobose. 186. *C. Deweyana.*
Perigynia strongly several-nerved; spikes narrowly oblong-cylindric. 187. *C. bromoides.*

(**b**) *Perigynia with a narrow or broad marginal wing.* Nos. 188–205. Ovales.

Perigynia lanceolate or ovate-lanceolate, 2–5 times as long as wide.
Top of the culm nodding; arctic and northwestern species. 188. *C. pratensis.*
Culms strictly erect, mostly stiff.
Perigynia nerveless, broadly winged; northwestern species. 189. *C. xerantica.*
Perigynia several-nerved on both faces.
Perigynia broadly winged; staminate flowers intermixed with the pistillate. 190. *C. siccata.*
Perigynia narrowly winged; staminate flowers all basal.
Spikes ½′–1′ long; perigynia about 4″ long. 191. *C. Muskingumensis.*
Spikes 2″–8″ long; perigynia 2″–3″ long.
Spikes oblong or oval; perigynia ascending or erect.
Spikes green-brown, blunt. 192. *C. tribuloides.*
Spikes bright brown, pointed; perigynia lanceolate. 193. *C. scoparia.*
Spikes rather dark brown, blunt; perigynia ovate-lanceolate. 194. *C. leporina.*
Spikes subglobose; perigynia spreading, at least when old. 195. *C. cristatella.*
Perigynia ovate, not more than twice as long as wide (longer in some forms of no. 198.)
Perigynia narrowly winged above; heads greenish brown. 196. *C. adusta.*
Perigynia broadly wing-margined.
Perigynia spreading or ascending.
Spikes silvery green. 197. *C. foenea.*
Spikes yellowish brown or greenish. 198. *C. straminea.*
Perigynia erect or appressed.
Heads silvery green or nearly white; sea-beach species. 199. *C. silicea.*
Heads brown-green; meadow or marsh species. 200. *C. lenera.*
Perigynia orbicular, very broadly ovate or somewhat obovate, sometimes wider than long.
Heads green-brown.
Perigynia spreading or ascending; achene sessile. 201. *C. festucacea.*
Perigynia erect, 2″–2½″ broad; achene short-stalked. 202. *C. alata.*
Heads silvery green, yellowish or whitish.
Perigynium-wing firm; achene sessile. 203. *C. albolutescens.*
Perigynium-wing membranous; achene stalked. 204. *C. Bicknellii.*
Perigynia narrowly linear-lanceolate, tapering into a subulate beak 2–3 times as long as the body. Cyperoideae. 205. *C. sychnocephala.*

1. Carex pauciflòra Lightf. Few-flowered Sedge. (Fig. 671.)

Carex pauciflora Lightf. Fl. Scot. 543. *pl. 6.* 1777.

Glabrous, culms erect or assurgent, very slender, 3′–2° high. Leaves very narrow, shorter than the culm, the lowest reduced to toothed sheaths; spike solitary, androgynous, the staminate and pistillate flowers each 2–5, the staminate uppermost; perigynium green, narrow, scarcely inflated, 3″–4″ long, about ½″ in diameter, several-nerved, tapering from below the middle into a slender or almost subulate beak, strongly reflexed and readily detachable when mature, 2–3 times longer than the deciduous lanceolate or ovate scale; stigmas 3.

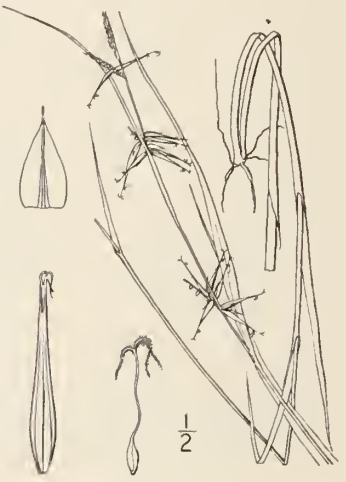
In bogs, Newfoundland to Alaska, south to Massachusetts, Pennsylvania, Michigan and Washington. June–Aug.

2. Carex Collinsii Nutt. Collins' Sedge. (Fig. 672.)

Carex subulata Michx. Fl. Bor. Am. 2: 173. 1803. Not Gmel. 1791.
Carex Collinsii Nutt. Gen. 2: 205. 1818.
Carex Michauxii Dewey, Am. Journ. Sci. 10: 273. 1826. Not Schwein. 1824.

Glabrous, culms very slender, erect or reclining, 6′–2° long. Leaves narrow, the broadest about 2½″ wide, the uppermost not exceeding the culm; staminate spike terminal, stalked; pistillate spikes 2–4, distant, 2–8-flowered, short-stalked, or the stalk of the lowest sometimes 1½′ long; bracts similar to the upper leaves, elongated; perigynium light green, scarcely inflated, subulate, 5″–7″ long, tapering from below the middle into an almost filiform beak, faintly many-nerved, strongly reflexed when mature, about 3 times as long as the hyaline lanceolate-acuminate persistent scale, its teeth reflexed at maturity; stigmas 3.

In bogs, Rhode Island to eastern Pennsylvania, south to South Carolina and Georgia. Ascends to 2000 ft. in Pennsylvania. Attributed to Canada by Michaux. June–Aug.



3. Carex abácta Bailey. Yellowish Sedge. (Fig. 673.)

Carex rostrata Michx. Fl. Bor. Am. 2: 173. 1803. Not Stokes, 1787.
Carex xanthophysa Dewey, Am. Journ. Sci. 14: 353. *f. 57, 58.* 1828. Not Wahl. 1803.
Carex Michauxiana Boeckl. Linnaea, 40: 336. 1877. Not *C. Michauxii* Schwein. 1824.
Carex abacta Bailey, Bull. Torr. Club, 20: 427. 1893.

Glabrous, whole plant yellowish, culm erect or slightly assurgent at the base, rather stiff, slender, 1°–2° high. Leaves narrow, the broadest about 2″ wide, the uppermost often exceeding the culm; staminate spike terminal, closely sessile; pistillate spikes 2 or 3, several-flowered, the upper sessile or very nearly so and closely approximated, the lowest, when present, remote and borne on a stalk ½′–2′ long; bracts similar to the leaves, usually erect and overtopping the culm; perigynia slender, narrow, scarcely inflated, erect or spreading, tapering into a subulate 2-toothed beak, 5″–7″ long, less than 1″ thick at the base, rather strongly many-nerved, about twice as long as the lanceolate or ovate, acute or acuminate scale; stigmas 3.

In bogs and wet meadows, Newfoundland to New Hampshire, New York and Pennsylvania, west to Michigan. Ascends to 5000 ft. in New Hampshire. Also in Japan. July–Sept.

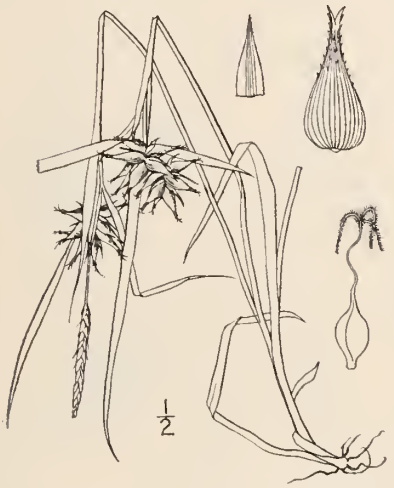
4. Carex folliculàta L. Long Sedge. (Fig. 674.)

Carex folliculata L. Sp. Pl. 978. 1753.

Glabrous, light green or yellowish, culm stout or slender, erect or reclining, 1½°–3° long. Leaves broad and elongated, sometimes overtopping the culm, often ½′ wide; staminate spike stalked or nearly sessile; pistillate spikes 2–4, usually distant, all except the uppermost slender-stalked, several-many-flowered, the lower often nodding on a stalk 2′–3′ long; bracts commonly overtopping the spikes; perigynia ovoid, somewhat inflated, ascending or spreading, green, rather prominently many-veined, 6″–8″ long, 1″ or a trifle more in diameter near the base, tapering from below the middle into a slender 2-toothed beak, one-third to one-half longer than the awned broadly scarious-margined persistent scale; teeth of the perigynium nearly erect; stigmas 3.

In swamps and wet woods, Newfoundland to Maryland, west to Michigan and West Virginia. May–Sept.

5. Carex intumèscens Rudge. Bladder Sedge. (Fig. 675.)



Carex intumescens Rudge, Trans. Linn. Soc. 7: 97. *pl. 9. f. 3.* 1804.

Glabrous, culms slender, commonly tufted, erect or slightly reclined, 1½°–3° high. Leaves elongated, dark green, shorter than or sometimes equalling the culm, roughish, 1½″–3″ wide; bracts similar, overtopping the culm; staminate spike narrow, mostly long-stalked; pistillate spikes 2 (1–3) sessile or very short-stalked, globose or ovoid; perigynia 1–30, spreading or the upper erect, 6″–10″ long, much inflated, about 3″ in diameter above the base, many-nerved, tapering from below the middle into a subulate 2-toothed beak, the teeth somewhat spreading at maturity; scales narrowly lanceolate, acuminate or aristate, about one-half as long as the perigynia; stigmas 3.

In swamps, bogs and wet woods, Newfoundland to Manitoba, south to Florida and Louisiana. May–Oct.

Carex intumescens Fernaldi Bailey, Bull. Torr. Club, 20: 418. 1893.
Perigynia narrower, 1–5 in each spike, all erect or slightly spreading. Maine to New York.

6. Carex Asa-Gràyi Bailey. Gray's Sedge. (Fig. 676.)

Carex intumescens var. *globularis* A. Gray, Ann. Lyc. N. Y. 3: 236. 1834. Not *C. globularis* L. 1753.
Carex Grayi Carey, Am. Journ. Sci. (II.) 4: 22. 1847. Not *C. Grayana* Dewey, 1834.
Carex Asa-Grayi Bailey, Bull. Torr. Club, 20: 427. 1893.
Carex Asa-Grayi hispidula Bailey, Bull. Torr. Club, 20: 427. 1893.

Glabrous, culms stout, erect or slightly assurgent at the base, 2°–3° tall. Leaves elongated, dark green, 3″–4½″ wide, the upper commonly overtopping the culm; bracts similar to the upper leaves, usually much overtopping the culm; staminate spike mostly long-stalked; pistillate spikes 1 or 2, globose, dense, about 1′ in diameter; perigynia 10–30, ovoid, glabrous or pubescent, much inflated, many-nerved, about 4″ in diameter above the base, tapering to a sharp 2-toothed beak; scales ovate or lanceolate, acuminate or cuspidate, scarious, about one-third as long as the perigynia; stigmas 3.

In swamps and wet meadows, Vermont to Michigan, south to Georgia and Missouri. June–Sept.

7. Carex Louisiánica Bailey. Louisiana Sedge. (Fig. 677.)

Carex Halei Carey; Chapm. Fl. S. States, 543. 1860. Not Dewey, 1846.
C. Louisianica Bailey, Bull. Torr. Club, 20: 428. 1893.

Culms slender, erect, smooth or very nearly so, 1°–2° tall. Leaves 1″–2″ wide, roughish, the upper overtopping the spikes; bracts similar to the upper leaves, rough; pistillate spikes 1–3, oblong, about 1′ long, 8″–10″ thick, erect, the lower slender-stalked, the upper nearly sessile; staminate spike solitary, long-stalked; perigynia ovoid, much inflated, smooth, strongly several-nerved, shining when mature, 5″–6″ long, about 2½″ in diameter at the rounded base, tapering gradually into the long 2-toothed beak, the small teeth slightly spreading; scales oblong-lanceolate, acuminate, about one-half as long as the perigynia; stigmas 3.

Swamps, Missouri to Texas and Florida. June–Aug.

8. Carex lupulìna Muhl. Hop Sedge. (Fig. 678.)

Carex gigantea Rudge, Trans. Linn. Soc. 7: 99. *pl. 10. f. 2.* 1804. ?
Carex lupulina Muhl.; Schk. Riedg. 2: 54. *f. 123.* 1806.
Carex lupulina var. *pedunculata* Dewey in Wood, Bot. & Flor. 376. 1870.

Glabrous, culms stout, erect or reclining, 1°–4° tall. Leaves elongated, nodulose, 2½″–6″ wide, the upper ones and the similar bracts much overtopping the culm; staminate spike solitary or rarely several, nearly sessile or slender-peduncled, rather stout; pistillate spikes 2–5, densely many-flowered, sessile or the lower slender-stalked, oblong, 1½′–2½′ long, often 1′ in diameter; perigynia ascending or spreading, often short-stalked, much inflated, many-nerved, 6″–9″ long, about 1½″ in diameter just above the base, tapering from much below the middle into a subulate 2-toothed beak; achene longer than thick; scales lanceolate, acuminate or aristate, one-third as long as the perigynia; stigmas 3.

In swamps and ditches, Hudson Bay to western Ontario, Florida and Texas. June–Aug.

Carex lupulìna Bélla-villa (Dewey) Bailey, Mem. Torr. Club, 1: 12. 1889.
Carex Bella-villa Dewey, Am. Journ. Sci. (II.) 41: 229. 1866.

Culm slender; pistillate spikes remote, slender-stalked, sometimes staminate at the summit, the perigynia widely spreading at maturity, the staminate spike sometimes branched and with 1 or 2 perigynia at its base. Eastern New York to southern Ontario.

A hybrid with *C. retrorsa* is described by Professor Dudley (Cayuga Fl. 119. 1886).

9. Carex lupulifórmis Sartwell. Hop-like Sedge. (Fig. 679.)

Carex lupulina var. *polystachya* Schw. & Torr. Ann. Lyc. 1: 337. 1825. Not *C. polystachya* Sw.
Carex lupuliformis Sartw.; Dewey, Am. Journ. Sci. (II.) 9: 29. 1850.

Glabrous, culm stout, erect, 1½°–3° tall. Leaves and bracts similar to those of the preceding species, much elongated; staminate spike solitary, stalked or nearly sessile, sometimes 4′ long; pistillate spikes 3–6, stalked or the upper sessile, densely many-flowered, 2′–3′ long, 6″–10″ in diameter, often staminate at the top; perigynia yellowish, at first appressed, later ascending, sessile, much inflated, several-nerved, 5″–8″ long, about 2″ in diameter above the base, tapering from below the middle to a subulate 2-toothed beak; achene as long as thick, its angles mamillate; scales lanceolate, awned, shorter than or equalling the perigynia.

Swamps, Rhode Island to Del. and Minnesota. June–Aug.

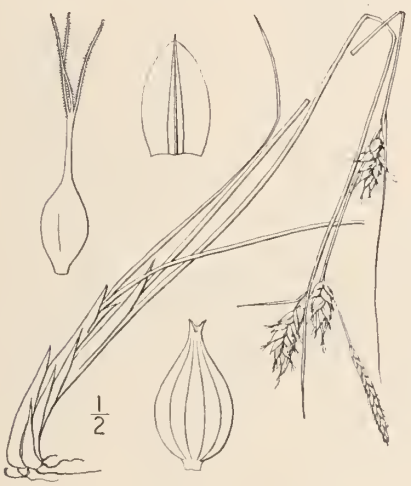
10. Carex grándis Bailey. Large Sedge. (Fig. 680.)

Carex gigantea Dewey, Am. Journ. Sci. 11: 164. 1826. Not Rudge, 1804.
Carex grandis Bailey, Mem. Torr. Club, 1: 13. 1889.

Glabrous, culms slender, erect or reclining, 2°–3° high. Leaves rather dark green, elongated, 4″–6″ wide, the uppermost sometimes surpassing the culm; bracts similar to the leaves, much overtopping the culm; staminate spike sessile or pedunculed, sometimes bearing perigynia at its base; pistillate spikes 3–5, all stalked or the upper sessile, cylindric, 1′–3′ long, sometimes staminate at the summit; perigynia much swollen at the base, and about 2″ in diameter, 5″–6″ long, many-nerved, spreading at maturity, 3–4 times as long as the scarious lanceolate acuminate or aristate scale, abruptly contracted into a subulate 2-toothed beak 2–3 times as long as the inflated portion; stigmas 3.

In swamps, Delaware to Kentucky and Missouri, south to Florida, Louisiana and Texas. June–Aug.

11. Carex oligospérma Michx. Few-seeded Sedge. (Fig. 681.)



Carex oligosperma Michx. Fl. Bor. Am. 2: 174. 1803.

Glabrous, culms very slender, erect, rather stiff, 1½°–3° tall. Leaves about 1½″ wide, not exceeding the culm, involute when old; bracts similar, overtopping the culm; staminate spike stalked, narrowly linear; pistillate spikes 1 or 2, globose or oblong, 5″–10″ long, sessile or the lower short-stalked, few–several-flowered, the upper sometimes reduced to 1 or 2 perigynia and with a staminate summit; perigynia ovoid, erect, inflated, strongly few-nerved, yellowish green, 2″–2½″ long, about 1¼″ in diameter, tapering from the middle into a minutely 2-toothed beak; scales acute or mucronate, shorter than the perigynia; stigmas 3.

In bogs, Labrador to the Northwest Territory, south to Massachusetts, Pennsylvania and Michigan. June–Sept. Ascends to 4000 ft. in the Adirondacks.

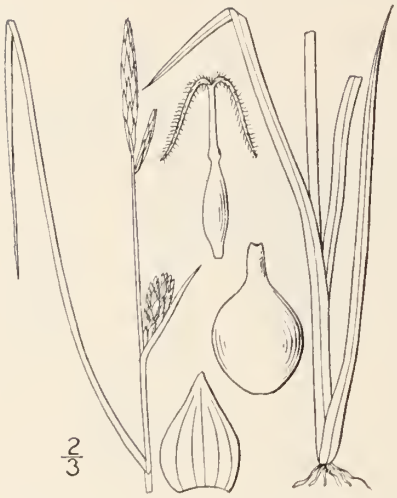
12. Carex Raeàna Boott. Rae's Sedge. (Fig. 682.)

Carex miliaris var. *aurea* Bailey, Mem. Torr. Club, 1: 37. 1889. Not *C. aurea* Nutt. 1818.
Carex pulla A. Gray, Man. Ed. 5, 602. 1867. Not Gooden. 1797.
Carex Raeana Boott; Richards. Arct. Exp. 2: 344. 1851.

Culm stouter than that of *C. miliaris*, very rough above, 1½°–3° tall. Leaves 1″–1½″ wide, flat, shorter than the culm, nodulose, somewhat scabrous on the margins, the lower bracts narrower, about equalling the culm; staminate spikes 1–4, slender-stalked; pistillate spikes 1–3, erect, cylindric or oblong, 6″–12″ long, sessile or the lower short-stalked; perigynia oblong-elliptic, yellowish-green, few-nerved, acute, narrowed into a rather conspicuous 2-toothed beak; scales lanceolate, acute or acuminate, yellowish or brown-margined, slightly shorter than the perigynia; stigmas 2 or 3.

On lake and river shores, northern Maine to Labrador. Summer.

13. Carex miliàris Michx. Northeastern Sedge. (Fig. 683.)



Carex miliaris Michx. Fl. Bor. Am. 2: 174. 1803.
Carex miliaris var. *major* Bailey, Mem. Torr. Club, 1: 36. 1889. ?

Glabrous, culm very slender, erect, roughish above, 1°–2° tall. Leaves flat, about 1″ wide, elongated, nodulose, the upper about equalling the culm; bracts similar to the leaves, often overtopping the culm; staminate spikes 1 or 2, stalked, narrowly linear; pistillate spikes 1–3, oblong or linear-oblong, many-flowered, 4″–1′ long, the upper sessile, the lowest, when three, stalked; perigynia inflated, ovoid, faintly few-nerved, 1″–1½″ long, dark brown or brown-tipped, tapering into a short, nearly entire beak, slightly longer than the ovate or ovate-lanceolate, wholly or partly brown, obtuse or acute scale; stigmas 2.

Borders of lakes and streams, Labrador and northern Quebec. Reported from northern Minnesota. Summer.

14. Carex saxátilis L. Russet Sedge. (Fig. 684.)

Carex saxatilis L. Sp. Pl. 976. 1753.
Carex pulla Gooden. Trans. Linn. Soc. 3: 78. 1797.

Glabrous, culms erect, slender, 3′–12′ tall. Leaves flat, 1″–1½″ broad, the upper not overtopping the culm; bracts short; staminate spike solitary, short-stalked; pistillate spikes 1–4, all stalked or the upper nearly or quite sessile, oblong, densely many-flowered; perigynia dark purple-brown, ascending, ovoid, slightly inflated, nerveless or very faintly few-nerved, tipped with a short minutely 2-toothed beak; scales oblong, subacute, greenish purple, about as long as the perigynia; stigmas usually 2.

Greenland to James Bay and Alaska. Also in arctic Europe and Asia. Summer.

15. Carex membranopácta Bailey. Fragile Sedge. (Fig. 685.)

Carex compacta R. Br. in Ross' Voy. App. cxliii. 1819. Not Krock. 1814.
Carex membranacea Hook. Parry's 2d Voy. App. 406. 1825. Not Hoppe.
Carex membranopacta Bailey, Bull. Torr. Club, 20: 428. 1893.

Similar to *C. saxatilis* but stouter and taller, 6′–18′ high. Leaves flat, not exceeding the culm, 1½″ wide; bracts short, the lower commonly longer than its spike, the upper subulate; staminate spikes 1–3, short-stalked; pistillate spikes 1–3 (commonly 2), sessile or the lower short-peduncled, narrowly oblong, obtuse, densely many-flowered, about 1′ long and 4″ in diameter; perigynia spreading, brown-purple, ovoid, fragile, much inflated, about 1½″ long, tipped with a short nearly entire beak, little nerved, about as long as the ovate-oblong greenish-purple or white-margined scales.

Greenland, through arctic America to Kamptchatka. Summer.

16. Carex ambústa Boott. Blackened Sedge. (Fig. 686.)

Carex ambusta Boott, Ill. 64. *pl. 172.* 1858.

Similar to *C. saxatilis*, culms slender, erect, 8′–18′ tall, nearly or quite smooth. Leaves nearly or quite smooth, elongated, mostly less than 1″ wide, involute in drying, nearly erect, shorter than the culm; bracts similar to the upper leaves, sometimes equalling or overtopping the culm; staminate spike solitary, stalked; pistillate spikes 1 or 2, oblong, erect, obtuse, densely many-flowered, slender-stalked or the upper nearly sessile, 6″–9″ long, about 3½″ in diameter; perigynia oblong-lanceolate, 1½″ long, rather more than ½″ wide, spreading or ascending, biconvex, smooth, firm, not at all inflated, dull, faintly few-nerved at the base, green below, dark brown at the summit, tapering into a short minutely 2-toothed beak; scales lanceolate, dark brown, as long as the perigynia; stigmas 2.

Labrador, British Columbia to Alaska. Summer.

17. Carex utriculàta Boott. Bottle Sedge. (Fig. 687.)

Carex utriculata Boott; Hook. Fl. Bor. Am. 2: 221. 1840.

Carex utriculata var. *minor* Boott, loc. cit. 1840.

Glabrous, culms stout, erect, 2°–4° tall. Leaves elongated, nodulose, the upper mostly exceeding the culm, 2″–6″ wide, the midvein prominent; bracts overtopping the culm; staminate spikes 2–4, linear, stalked, the lower occasionally pistillate at the top and usually subtended by a very slender bract; pistillate spikes 3 or 4, nearly erect, cylindric, densely many-flowered or sometimes looser near the base, 2′–6′ long, the lower short-stalked, the upper sessile, sometimes staminate at the summit; perigynia spreading when old, ovoid, light green, somewhat inflated, few-nerved, 2″–2½″ long, narrowed into a sharp 2-toothed beak; scales lanceolate, the lower awned and slightly longer than the perigynia, the upper acute; stigmas 3.

Marshes, Anticosti to British Columbia, Delaware, Ohio, Minnesota, Nevada and California. June–Sept.

18. Carex monile Tuckerm. Necklace Sedge. (Fig. 688.)

Carex monile Tuckerm. Enum. Meth. 20. 1843.
Carex Olneyi Boott, Ill. 15. *pl. 42.* 1858.

Glabrous, culm slender, erect or reclining, 1½°–3° tall. Leaves elongated, rather light green, 1½″–2½″ wide, sometimes exceeding the culm, little or not at all nodulose; bracts similar, often overtopping the culm; staminate spikes 1–4, usually 2 or 3, slender-stalked, commonly subtended by short bracts; pistillate spikes 1–3, erect-spreading, cylindric, 1′–3′ long, about 4″ in diameter, many-flowered, rather loose at maturity, the upper sessile, the lower one, when 3, slender-stalked and usually remote; perigynia yellowish green, ascending or spreading, ovoid, inflated, about 2½″ long, rather strongly 8–10-nerved, tapering into a sharp 2-toothed beak; scales lanceolate, acuminate or awned, shorter than the perigynia; stigmas 3.

In marshes and wet meadows, Nova Scotia to British Columbia, south to New Jersey, Missouri, in the Rocky Mountains to Colorado, and to California. June–Aug.

Carex monile monstrósa Bailey, Mem. Torr. Club, 1: 40. 1889. A form with the terminal spike more or less pistillate, the pistillate spikes very small and loosely flowered, usually on very long stalks, found several years ago along the Concord River, Mass., has not since been collected.

19. Carex Tuckermàni Dewey. Tuckerman's Sedge. (Fig. 689.)

C. Tuckermani Dewey, Am. Journ. Sci. 49: 48. 1845.

Glabrous, culm very slender, usually roughish above, erect or reclining, 2°–3½° long. Leaves and bracts much elongated, commonly much overtopping the culm, 1½″–2½″ wide, sometimes sparingly nodulose; staminate spikes 2 or 3; pistillate spikes stout, cylindric, 1′–2′ long, about ½′ in diameter; the upper sessile or nearly so, the lower stalked and usually spreading; perigynia very much inflated, yellowish-green, ovoid, prominently few-nerved, ascending, abruptly contracted into a subulate 2-toothed beak; scales lanceolate, smooth-awned, about half as long as the perigynia; stigmas 3.

In bogs and meadows, New Brunswick to Ontario, New Jersey, Michigan and Minnesota. June–Aug.

20. Carex bullàta Schk. Button Sedge. (Fig. 690.)

Carex bullata Schk. Riedg. Nachtr. 85. *f. 166.* 1806.

Glabrous, culms very slender, erect, 1°–2½° high, roughish above. Leaves and bracts very narrow and elongated, rather stiff, commonly overtopping the culm, rarely more than 2″ wide, rough-margined, sparingly nodulose; staminate spikes mostly 2, long stalked; pistillate spikes 1–3, usually 2, light green, varying from almost sessile to long-stalked and spreading, many-flowered, oblong or oblong-cylindric, 1′–1½′ long, 4½″–6″ in diameter; perigynia much inflated, ovoid, 2½″–3″ long, spreading when mature, tapering into a subulate rough 2-toothed beak, shining, strongly nerved, 2–3 times longer than the lanceolate acuminate or acute scale, or the uppermost scales obtuse; stigmas 3.

In swamps, Massachusetts to North Carolina. June–Aug.

21. Carex retrórsa Schwein. Retrorse Sedge. (Fig. 691.)

Carex retrorsa Schwein. Ann. Lyc. N. Y. 1: 71. 1824.

Glabrous, culm stout, erect, smooth or slightly rough above, 1°–3½° tall. Leaves elongated, thin, rough-margined, sparingly nodulose, 2½″–3½″ wide, the upper commonly exceeding the culm, the bracts similar, usually much overtopping the culm; staminate spikes 1–3, short-stalked; pistillate spikes 3–6, ascending or spreading, all close together at the summit and sessile or very nearly so or the lowest distant and stalked, cylindric, densely many-flowered, 1′–2′ long, about ½′ in diameter; perigynia ovoid, membranous, strongly few-nerved, yellowish green, about 3″ long, reflexed at maturity, tapering into a subulate 2-toothed beak; scales lanceolate, acute, smooth, one-third to one-half as long as the perigynia; stigmas 3.

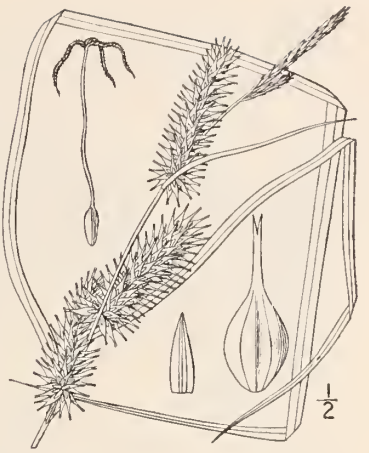
In swamps and wet meadows, Nova Scotia to Manitoba, south to Massachusetts, Pennsylvania, Michigan and Minnesota. Also in Oregon (according to Bailey). Aug.–Sept.

22. Carex Hàrtii Dewey. Hart Wright's Sedge. (Fig. 692.)

Carex Hartii Dewey, Am. Journ. Sci. (II.) **41**: 226. 1866.

Glabrous, culms slender, nearly smooth 1½°–2½° long. Leaves elongated, rough on the margins and lower side of the midvein, 2″–3″ wide, the upper and the similar bracts much overtopping the culm; staminate spikes 1 or 2, the lower sometimes pistillate at the base, borne on a stalk ½′–1′ long; pistillate spikes 2–4, scattered, rather loosely many-flowered, the upper sessile, the lower slender-stalked, 1′–2′ long, about ½′ thick, all erect or ascending; perigynia inflated, ovoid-conic, spreading or the lower slightly reflexed, prominently few-nerved, about 3″ long, gradually tapering into the long 2-toothed beak, 2–3 times as long as the lanceolate acute or acuminate scale; stigmas 3.

In marshes, Ontario and New York to Michigan. Apparently intergrades with the preceding species. June–Aug.



23. Carex lùrida Wahl. Sallow Sedge. (Fig. 693.)

C. lurida Wahl. Kongl. Acad. Handl. (II.) **24**: 153. 1803.
Carex tentaculata Muhl.; Willd. Sp. Pl. **4**: 266. 1805.

Glabrous, culm slender, erect, smooth or slightly scabrous above, 1½°–3° tall. Leaves elongated, rough, rarely more than 2″ wide, the upper and the similar bracts usually much overtopping the culm; staminate spike usually solitary, short-stalked, elongated; pistillate spikes, 1–4, cylindric, densely many-flowered, 1′–2′ long, about ½′ in diameter, the upper sessile, the lower peduncled and spreading or drooping; perigynia inflated, ovoid, tapering into a long subulate beak, ascending or the lower spreading, 4″ long, thin, yellowish green, rather conspicuously nerved, longer than the rough-awned scale; stigmas 3.

In swamps and wet meadows, Nova Scotia to Minnesota, Florida and Texas. June–Oct.

C. tentaculata altior Boott, is a hybrid with *C. lupulina*.

Carex lùrida fláccida Bailey, Mem. Torr. Club, **1**: 73. 1889.

Pistillate spikes ½′–1′ long, brown, all sessile or very nearly so, clustered at the summit, rather more loosely flowered. Northern New York to North Carolina and Tennessee.

Carex lùrida párvula (Paine) Bailey, Bull. Torr. Club, **20**: 418. 1893.
Carex tentaculata var. *parvula* Paine, Cat. Pl. Oneida, 105. 1865.

Culm 6′–18′ high; pistillate spikes only 1 or 2, scarcely more than ½′ long, globose or oblong, sessile or very nearly so; perigynia 3″ long. New Hampshire to Pennsylvania and Iowa.

Carex lùrida exúndans Bailey.

Culms long and spreading; pistillate spikes 1½′–2½′ long, on very long stalks; scales subulate, the lower often much longer than the perigynia. Occasional with the typical form.

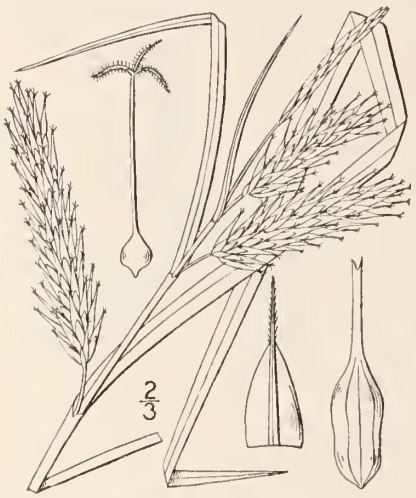
24. Carex Bàileyi Britton. Bailey's Sedge. (Fig. 694.)

Carex tentaculata var. *gracilis* Boott, Ill. 94. 1860. Not *C. gracilis*, R. Br. 1810.
Carex Baileyi Britton, Bull. Torr. Club, **22**: 220. 1895.

Glabrous, culms erect or reclining, very slender, minutely scabrous above, 1°–2° long. Leaves roughish, elongated, 1½″–2″ wide, the upper and the similar bracts exceeding the culm; staminate spike solitary, short-peduncled; pistillate spikes 1–3, narrowly cylindric, very densely many-flowered, all erect or ascending, 9″–2′ long, about 4″ in diameter, the upper sessile, the lower more or less stalked; perigynia inflated, ovoid, 2½″–3″ long, ascending, abruptly contracted into the subulate 2-toothed beak, prominently several-nerved, the lower about equalling, the upper longer than the linear-subulate ciliate-scabrous scale; stigmas 3.

Bogs, Vermont to Virginia and Tennessee. June–Aug.

25. Carex Schweinitzii Dewey. Schweinitz's Sedge. (Fig. 695.)



Carex Schweinitzii Dewey; Schwein. Ann. Lyc. N. Y. 1: 71. 1824.

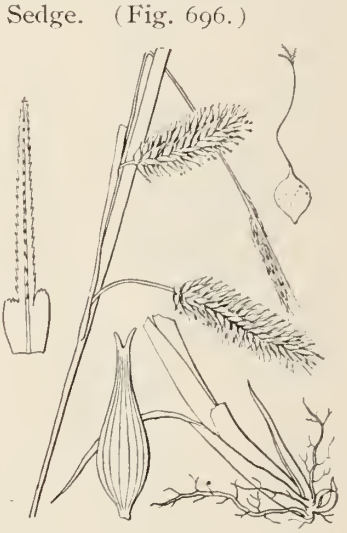
Glabrous, light green, culm erect, roughish above, 1°–2½° tall. Leaves elongated, 2½″–4″ wide, the basal ones and the similar bracts commonly overtopping the culm, those of the culm mostly shorter; staminate spike solitary or sometimes 2, often pistillate at the base or in the middle; pistillate spikes 3–5, ascending, linear-cylindric, not very densely flowered, 1½′–3′ long, about 4″ thick, the upper usually sessile, the lower stalked; perigynia thin, somewhat inflated, ovoid-conic or oblong, tapering into the subulate, 2-toothed beak, about 2½″ long and 1″ in diameter, ascending, rather prominently few-nerved, equalling or the upper longer than the lanceolate or linear, usually ciliate-scabrous scale; stigmas 3.

In swamps and bogs, Massachusetts to Ontario, Michigan, New Jersey and Missouri. June–Aug.

26. Carex hystricina Muhl. Porcupine Sedge. (Fig. 696.)

Carex hystricina Muhl.; Willd. Sp. Pl. 4: 282. 1805.

Glabrous, light green, culms slender, erect or reclining, somewhat rough above, 1°–2° tall. Leaves elongated, minutely scabrous, 1½″–2½″ wide, the upper and the similar bracts overtopping the culm; staminate spike slender-stalked, sometimes pistillate at the summit; pistillate spikes 1–4, oblong-cylindric, densely many-flowered, ½′–1½′ long, about 4½″ in diameter, the upper sessile or nearly so, the lower slender-stalked and drooping; perigynia ascending, somewhat inflated, ovoid-conic, 2½″–3″ long, strongly many-nerved, tapering into the subulate 2-toothed beak, equalling or the upper longer than the narrow rough scales; stigmas 3.

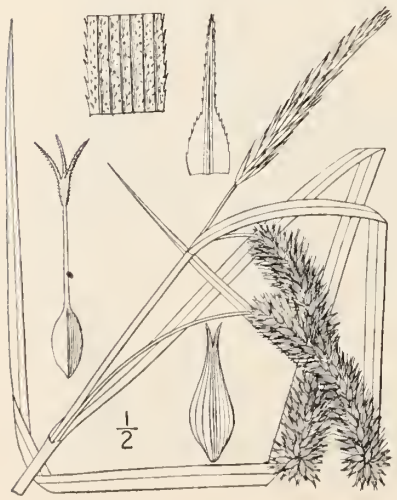


In swamps and low meadows, Nova Scotia to the Northwest Territory, south to Georgia and Nebraska. June–Aug.

Carex hystricina Dudleyi Bailey. Mem. Torr. Club, 1: 54. 1889.

Culms often reclining, 2°–3° long; leaves 2½″–4″ wide; staminate spike long-stalked; pistillate spikes 1½′–2½′ long, 5″ in diameter, filiform-stalked. Maine to Connecticut, western New York, Pennsylvania and Michigan.

27. Carex Pseùdo-Cypèrus L. Cyperus-like Sedge. (Fig. 697.)

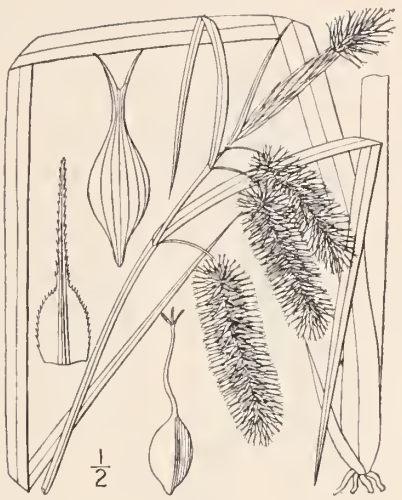


Carex Pseudo-Cyperus L. Sp. Pl. 978. 1753.

Glabrous, culms rather stout, rough on the sharp angles, at least above, 2°–3° high. Leaves elongated, rough on the margins, nodulose, 2½″–5″ wide, the upper and the similar bracts overtopping the culm; staminate spike short-stalked; pistillate spikes 2–5, linear-cylindric, densely many-flowered, all slender-stalked and spreading or drooping, 1′–2½′ long, 3″–4″ in diameter, the stalk of the lowest one sometimes 2′ long; perigynia light green, slightly inflated, conic, prominently many-ribbed, somewhat flattened, at length reflexed, tapering into a short 2-toothed beak, the short teeth slightly spreading; scales linear with a broad base, ciliate-scabrous, about equalling the perigynia; stigmas 3.

In bogs, Nova Scotia to Manitoba, Maine, New York, and Michigan. Also in Europe and Asia. June–Aug.

28. Carex comòsa Boott. Bristly Sedge. (Fig. 698.)



Carex comosa Boott, Trans. Linn. Soc. **20**: 117. 1846.
Carex Pseudo-Cyperus var. *comosa* W. Boott, in S. Wats. Bot. Cal. **2**: 252. 1880.

Similar to the preceding species, culms commonly stouter, the leaves sometimes ½′ wide. Staminate spike short-stalked, sometimes pistillate at the summit; pistillate spikes 2–6, usually 3–5, stalked or the uppermost nearly sessile, all spreading or drooping, stouter and bristly, about ½′ in diameter; perigynia more slender, little inflated, strongly reflexed when mature, tapering into a slender, prominently 2-toothed beak, the teeth subulate and recurved-spreading; scales mostly shorter than the perigynia, very rough; stigmas 3.

In swamps and along the borders of ponds, Nova Scotia to southern Ontario and Washington, south to Georgia, Louisiana and California. May–Oct.

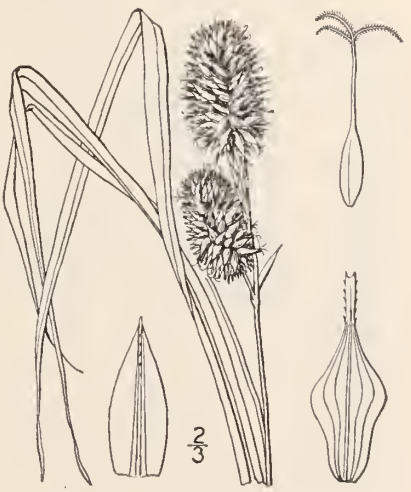
29. Carex Fránkii Kunth. Frank's Sedge. (Fig. 699.)

Carex Frankii Kunth, Enum. **2**: 498. 1837.
Carex stenolepis Torr. Ann. Lyc. N. Y. **3**: 420. 1836. Not Less. 1831.

Glabrous, much tufted, culms stout, smooth, erect, very leafy, 1°–2½° tall. Leaves elongated, roughish, 2½″–4″ wide, the upper ones and the similar bracts commonly overtopping the culm; staminate spike stalked, sometimes pistillate at the summit; pistillate spikes 3–6, exceedingly dense, cylindric, erect, ½′–1½′ long, about 4″ in diameter, the upper nearly or quite sessile, the lower slender-stalked; perigynia green, slightly inflated, about 1″ in diameter, few-nerved, obovoid with a depressed summit from which arises the subulate 2-toothed beak; scales linear-subulate, longer than the perigynia; stigmas 3.

In swamps and wet meadows, eastern Pennsylvania to eastern Virginia and Georgia, west to Illinois, Missouri, Louisiana and Texas. June–Sept.

30. Carex squarròsa L. Squarrose Sedge. (Fig. 700.)



Carex squarrosa L. Sp. Pl. 973. 1753.

Glabrous, culms slender, erect or reclining, rough above on the angles, 2°–3° tall. Leaves elongated, rarely more than 2″ wide, rough-margined, the bracts similar and somewhat overtopping the culm; spikes 1–3, erect, stalked, oblong or globose, exceedingly dense, rarely over 1′ long, 6″–10″ in diameter, the upper one club-shaped, staminate at the base or sometimes for one-half its length or more; perigynia yellowish green, becoming tawny, spreading or the lowest reflexed, somewhat inflated but firm, obovoid, 1″–1½″ in diameter, few-nerved, abruptly narrowed into the subulate minutely 2-toothed beak, twice as long as the scarious lanceolate acuminate or awn-tipped scale; achene linear-oblong, tapering into the stout style; stigmas 3.

In swamps and bogs, Connecticut to Indiana, Michigan and Nebraska, south to Georgia, Louisiana and Arkansas. June–Sept.

31. Carex typhinoides Schwein. Cat-tail Sedge. (Fig. 701.)

Carex typhinoides Schwein. Ann. Lyc. 1: 66. 1824.
Carex squarrosa var. *typhinoides* Dewey, Am. Journ. Sci. 11: 316. 1826.

Similar to the preceding species, but darker green, the leaves much broader, often 4″–5″ wide, the similar bracts much overtopping the culm; spikes 2–6, cylindric, very dense, 1′–1¾′ long, 4″–7″ in diameter, often staminate at both ends, the terminal one commonly tapering to a conic summit; basal staminate flowers much less numerous than in *C. squarrosa;* perigynia dull straw-color, obovoid, ascending or the lowest spreading or reflexed, inflated, abruptly contracted into the slender 2-toothed beak, which is often upwardly bent; scales oblong-lanceolate, obtusish; achene ovoid-elliptic, sharply 3-angled with concave sides, tipped with the subulate straight style.

In swamps, Quebec to Virginia, Louisiana and Missouri. July–Aug.

32. Carex trichocàrpa Muhl. Hairy-fruited Sedge. (Fig. 702.)

Carex trichocarpa Muhl.; Willd. Sp. Pl. 4: 302. 1805.
Carex trichocarpa var. *imberbis* A. Gray. Man. Ed. 5, 597. 1867.
Carex laeviconica Dewey, Am. Journ. Sci. 24: 47. 1857.

Culm usually stout and tall, smooth below, very rough above. Leaves elongated, glabrous, rough-margined, 2″–3″ wide, the upper ones and the similar bracts commonly overtopping the culm; staminate spikes 2–6, long-stalked; pistillate spikes cylindric, densely flowered except at the base, 1′–4′ long, 5″–8″ in diameter, the upper sessile or nearly so and erect, the lower slender-stalked and sometimes spreading or drooping; perigynia ovoid-conic, pubescent or glabrous, prominently many-ribbed, 4″–5″ long, 1″–1½″ in diameter, tapering gradually into the stout conspicuously 2-toothed beak, the teeth somewhat spreading; scale hyaline, acute or acuminate, one-half as long as the perigynia or longer; stigmas 3.

In marshes and wet meadows, Quebec to Michigan, south to Georgia, Missouri and Kansas. June–Aug.

33. Carex aristàta R. Br. Awned Sedge. (Fig. 703.)

Carex aristata R. Br. Frank. Journ. 751. 1823.
Carex trichocarpa var. *aristata* Bailey, Coult. Bot. Gaz. 10: 294. 1885.

Culms stout erect, smooth or roughish above, sharp-angled, 2°–5° tall. Leaves elongated, 2½″–5″ wide, more or less scabrous, often pubescent beneath and on the sheaths; bracts similar, the lower often overtopping the culm; staminate spikes as in the preceding species; pistillate spikes 3–5, remote, cylindric, sessile or the lower short-stalked, loosely flowered at the base, dense above, 1′–4′ long, sometimes 8″ in diameter; perigynia ascending, conic, glabrous, conspicuously many-ribbed, 4″–6″ long, gradually tapering into the conspicuously 2-toothed beak, the teeth divergent; scales oblong-lanceolate, rough-awned, thin-margined, one-half to two-thirds as long as the perigynia.

In bogs, Ontario to the Northwest Territory, New York, Michigan, Utah and Oregon. June–Aug.

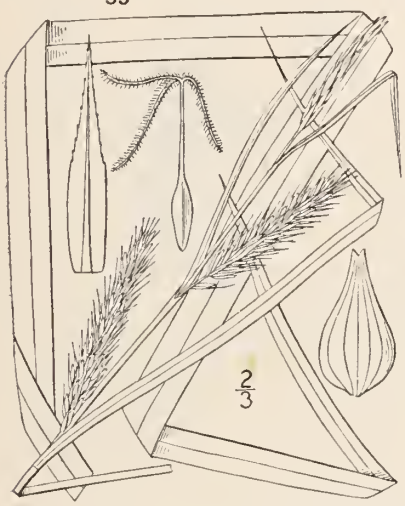
34. Carex ripària Curtis. River-bank Sedge. (Fig. 704.)

Carex riparia Curtis, Fl. Lond. 4: *pl. 60.* 1821.

Glabrous, pale green, culms stout or rather slender, smooth, or somewhat rough above, erect, 2°–3½° tall. Leaves elongated, sometimes nodulose, slightly scabrous, somewhat glaucous, 3″–6″ wide, about equalling the culm; lower bract similar to the leaves, the upper mostly narrower and shorter; staminate spikes 1–5; pistillate spikes 2–5, cylindric, 1½′–4′ long, about 4″ in diameter, the upper erect, sessile or nearly so, the lower more or less stalked and sometimes spreading or drooping; perigynia narrowly ovoid, firm, scarcely inflated, ascending, tapering gradually into a short 2-toothed beak, the teeth divergent; scales lanceolate or oblanceolate, long-aristate or acute, the lower longer, the upper equalling or shorter than the perigynia; stigmas 3.

In swamps, Newfoundland to James' Bay and Manitoba, south to Florida, Louisiana, Texas and Idaho. Also in Europe. May–Aug.

35. Carex acutifórmis Ehrh. Swamp Sedge. (Fig. 705.)



Carex acutiformis Ehrh. Beitr. 4: 43. 1789.
Carex paludosa Gooden. Trans. Linn. Soc. 2: 202. 1794.

Culms stout, erect, sharp-angled, 2°–3° tall, smooth below, often rough above. Leaves 2½″–6″ wide, flat, pale green, equalling or sometimes exceeding the culm; lower bracts similar to the leaves, the upper short and narrow; staminate spikes 1–3, stalked; pistillate spikes 3–5, narrowly linear-cylindric, 1½′–3′ long, 2″–2½″ thick, the upper sessile or nearly so and erect, the others slender-stalked, spreading or drooping; perigynia ovoid, 1½″ long, not inflated, strongly many-nerved, tapering into a very short and minutely 2-toothed beak; scales awn-tipped, longer than the perigynia or the upper equalling them; stigmas 3.

In swamps and wet meadows, eastern Massachusetts. Naturalized from Europe. June–Aug.

36. Carex Shortiàna Dewey. Short's Sedge. (Fig. 706.)

Carex Shortiana Dewey, Am. Journ. Sci. 30: 60. 1836.

Glabrous, culms rather slender, erect, rough above, 1°–3° tall, usually overtopped by the upper leaves. Leaves elongated, roughish, 2″–2½″ wide; bracts short, narrow, rarely much exceeding the spikes; spikes 3–7, linear-cylindric, densely many-flowered, ½′–1½′ long, 1½″–2″ in diameter, erect, the lower stalked, the uppermost staminate below for about one-half its length; perigynia dark brown at maturity, compressed, 2-edged, orbicular or obovate, nerveless, slightly wrinkled, abruptly and minutely beaked, equalling or shorter than the scales, which are hyaline, scarious-margined, ovate or oblong-lanceolate, acute or obtuse and persistent; orifice of the perigynium entire or very nearly so; stigmas 3.

In moist meadows and thickets, Pennsylvania to Virginia and Tennessee, west to Illinois, Missouri and the Indian Territory. May–July.

37. Carex scabràta Schwein. Rough Sedge. (Fig. 707.)

Carex scabrata Schwein. Ann. Lyc. N. Y. 1: 69. 1824.

Glabrous, culms slender, erect or reclining, rough above, leafy, 1°–3° long. Leaves rough, much elongated, 2½″–7″ wide, the bracts similar but narrower and usually exceeding the culm; staminate spike short-stalked; pistillate spikes 3–6, erect, the upper short-stalked, the lower sometimes spreading or drooping, all linear-cylindric, densely many-flowered, 1′–2′ long, 2½″–4″ in diameter; perigynia greenish-brown, ovoid, somewhat inflated, strongly nerved, papillose, tipped with a short rough minutely 2-toothed or entire beak; scales lanceolate, acute or short-awned, prominently 1-nerved, shorter than the perigynia; stigmas 3.

In moist woods and thickets, New Hampshire and Ontario to Michigan, South Carolina and Tennessee. Ascends to 4200 ft. in Virginia. May–Aug.

38. Carex vestìta Willd. Velvet Sedge. (Fig. 708.)

Carex vestita Willd. Sp. Pl. 4: 263. 1805.

Culms strict and slender, erect or reclining, 1½°–2½° tall, rough above. Leaves distant, 1½″–2½″ wide, not overtopping the culm; bracts similar, but narrower, short, rough-ciliate on the margins; staminate spike solitary, rarely 2, almost sessile; pistillate spikes 1–5, oblong, 5″–10″ long, 3″–4″ in diameter, erect, commonly staminate at the summit, sessile or the lower very short-stalked; perigynia ovoid, ascending or the lower spreading, densely pubescent, less than 1″ in diameter, prominently few-ribbed, tapering gradually into a short conic 2-toothed whitish beak, slightly shorter than or equalling the ovate acute membranous scales; stigmas 3.

In sandy woods, Massachusetts to eastern New York and Pennsylvania, south to Georgia. June–July.

39. Carex Walteriàna Bailey. Walter's Sedge. (Fig. 709.)

Carex striata Michx. Fl. Bor. Am. 2: 174. 1803. Not Gilib. 1792.
Carex Walteriana Bailey, Bull. Torr. Club, 20: 429. 1893.
Carex Walteriana var. *brevis* Bailey, Bull. Torr. Club, 20: 429. 1893.

Culms slender, strict, erect, usually rough above, 1°–2½° tall. Leaves narrow and elongated, smooth or roughish, 1″–2″ wide, nodulose, not overtopping the culm; lowest bract similar, very long, the upper smaller and often almost filiform; staminate spikes 2–5, long-stalked; pistillate spikes 1 or 2, when 2 the lower remote from the upper, sessile or very short-stalked, oblong-cylindric, erect, 1′–1½′ long, about 4″ in diameter, rather loosely many-flowered; perigynia ovoid, purple-brown, many-nerved, slightly inflated, ascending, glabrous, or partly or wholly pubescent, 1½″ in diameter, tapering into a short 2-toothed beak, the teeth short; scales ovate, acute, short-aristate or obtuse, membranous, one-half the length of the perigynia; stigmas 3.

In pine-barren bogs, southern New Jersey to Florida, near the coast. May–July.

40. Carex Houghtònii Torr. Houghton's Sedge. (Fig. 710.)

Carex Houghtonii Torr. Ann. Lyc. N. Y. 3: 413. 1836.

Culms rather stout, rough above, erect, 1°–2½° tall, exceeding the leaves. Leaves and lowest bract 2″–3½″ wide, rough, their margins more or less revolute; upper bracts much shorter; staminate spikes 1–3, stalked, sometimes pistillate at the base; pistillate spikes 2 or 3, oblong-cylindric, ½′–1½′ long, 3″–4″ in diameter, erect, rather loosely several–many-flowered, the upper sessile, the lower stalked; perigynia broadly ovoid, 1½″ in diameter, light green, ascending, densely pubescent, prominently many-ribbed, narrowed into a short conspicuously 2-toothed beak; scales lanceolate, short-awned, hyaline-margined, strongly 1-nerved, somewhat shorter than the perigynia; stigmas 3.

In sandy or rocky soil, Nova Scotia to the Northwest Territory, south to Maine, Ontario, Michigan and Minnesota. June–Sept.

41. Carex lanuginòsa Michx. Woolly Sedge. (Fig. 711.)

Carex lanuginosa Michx. Fl. Bor. Am. 2: 175. 1803.
Carex filiformis var. *latifolia* Boeckl. Linnaea, 41: 309. 1876.
Carex filiformis var. *lanuginosa* B.S.P. Prel. Cat. N. Y. 63. 1888.

Culm slender, but usually rather stouter than that of *C. filiformis*, sharp-angled and rough above. Leaves and lower bracts elongated, flat, not involute, 1″–2″ wide, more or less nodulose, sometimes overtopping the culm; staminate spikes 1–3, long-stalked, sometimes pistillate at the base; pistillate spikes 1–3 usually distant, sessile or the lower slender-stalked, cylindric, 9″–18″ long, 2½″–3″ in diameter; perigynia like those of *C. filiformis;* but rather broader; scales acuminate or aristate.

In swamps and wet meadows, Nova Scotia to British Columbia, south to New Jersey, Pennsylvania, Kansas, New Mexico and California. June–Aug.

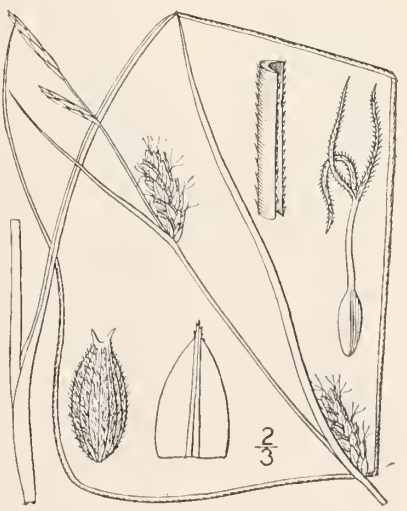
Carex lanuginòsa Kansàna Britton.

Plant pale; leaves ½″–1″ wide, very rough; perigynia ½″ in diameter, the ribs conspicuous. Missouri and Kansas.

42. Carex filifórmis L. Slender Sedge. (Fig. 712.)

Carex filiformis L. Sp. Pl. 976. 1753.

Culms very slender, erect or reclining, rather stiff, smooth, obtusely angled, 2°–3° long. Leaves very narrow, involute, about 1″ wide, rough on the inrolled margins, not overtopping the culm; lower bract similar, often equalling the culm; upper bracts filiform; staminate spikes 1–3, commonly 2, stalked; pistillate spikes 1–3, cylindric, 9″–15″ long, about 3″ in diameter, erect, sessile or the lower distant and short-peduncled; perigynia green, ascending, oval, densely pubescent, faintly nerved, about 1″ in diameter, tapering into a short 2-toothed beak; scales ovate, membranous, sometimes purplish, acute or short-awned, shorter than or equalling the perigynia; stigmas 3.



In wet meadows and swamps, Newfoundland to British Columbia, south to New Jersey, Pennsylvania, Michigan and Minnesota. Ascends to 2000 ft. in the Adirondacks. Also in Europe. June–Aug.

43. Carex hírta L. Hairy Sedge. (Fig. 713.)

Carex hirta L. Sp. Pl. 975. 1753.

Rootstocks extensively creeping, culms rather slender, erect, nearly smooth, 6′–2° tall. Leaves flat, pubescent, especially on the sheaths, rough, 1½″–2½″ wide, the basal ones much elongated, often exceeding the culm, the upper and the similar bracts shorter; staminate spikes 2 or 3, stalked; pistillate spikes 2 or 3, remote, erect, oblong-cylindric, 9″–18″ long, about 3″ in diameter, rather loosely many-flowered; perigynia ovoid-oblong, green, ascending, densely pubescent, 1″ in diameter, 2″ long, few-ribbed, tapering into a stout prominently 2-toothed beak; teeth often as long as the beak; scales membranous, lanceolate, aristate, 3-nerved, somewhat shorter than the perigynia; stigmas 3.

In fields and waste places, Massachusetts to eastern New York and Pennsylvania. Naturalized or adventive from Europe. June–Sept.

44. Carex alpìna Sw. Alpine Sedge. (Fig. 714.)

Carex alpina Sw.; Lilj. Sv. Flora, Ed. 2, 26. 1798.
Carex Vahlii Schk. Riedgr. 87. 1801.

Culms slender, erect, rough above, leafy only below the middle, 6′–2° tall. Leaves roughish, ½″–1½″ wide, shorter than or rarely equalling the culm; spikes 2–4 (commonly 3), clustered at the summit, the terminal 1 or 2 staminate below, oblong or globose, 2″–5″ long, sessile or the lower peduncled; perigynia oval, orbicular or obovoid, light green, about 1″ long, tipped with a very short and minutely 2-toothed beak, nerveless or with a few very faint nerves, equalling or slightly shorter than the ovate black or purple-brown obtuse or acutish scales; stigmas 3.

In rocky places, Quebec to James' Bay and Athabasca, western Ontario and Isle Royale, Lake Superior, south in the Rocky Mountains to Colorado. Also in Europe. Summer.

45. Carex atratifórmis Britton. Black Sedge. (Fig. 715.)

Carex ovata Rudge, Trans. Linn. Soc. 7: 96. *pl. 9.* 1804. Not Burm. 1768.
Carex atrata var. *ovata* Boott, Ill. 114. 1862.
Carex atratiformis Britton, Bull. Torr. Club, 22: 222. 1895.

Glabrous, culms slender, erect, sharp-angled, rough above, 8′–2° tall, usually leafy only below. Leaves smooth or roughish, 1″–2″ wide, rarely over 6′ long, much shorter than the culm; spikes 2–5, dense, oblong or oblong-cylindric, 4″–12″ long, about 2½″ in diameter, the terminal one usually staminate at the base and sessile, or nearly so, the others slender stalked, drooping when mature; lower bracts ½′–1½′ long, very narrow, the upper ones subulate; perigynia flattened, ovate or nearly orbicular, puncticulate, ascending, about 1″ long, tipped with a very short, 2-toothed beak; scales black or reddish-brown, oblong, obtuse or subacute, slightly narrower than the perigynia and about equalling them; stigmas 3.

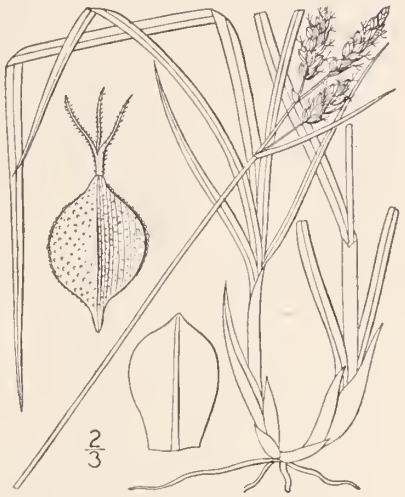
Newfoundland to the mountains of New England, west to the Northwest Territory. Summer.

46. Carex stylòsa C. A. Meyer. Variegated Sedge. (Fig. 716.)

Carex stylosa C. A. Meyer, Mem. Acad. St. Petersb. Div. Sav. 1: 222. *pl. 12.* 1825–31.

Culms slender, erect, 1°–1½° tall, rough and leafless above. Leaves 1½″ wide, shorter than or sometimes equalling the culm; staminate spike solitary, nearly sessile, often pistillate for one-half its length or more; pistillate spikes 2 or 3, oblong-cylindric, erect, 4″–6″ long, about 1½″ in diameter, the lowest slender-stalked and subtended by a linear-subulate bract; perigynia ovate, slightly inflated, brown, minutely granulate all over, less than 1″ long, nerveless and beakless, the orifice entire and closed by the usually protruding style; scales black with white veins, obtusish, shorter than the perigynia; stigmas 3.

Labrador and Greenland to Alaska. Summer.



47. Carex Parryàna Dewey. Parry's Sedge. (Fig. 717.)

Carex Parryana Dewey, Am. Journ. Sci. 27: 239. 1835.

Glabrous, culms very slender, smooth, erect, stiff, 8′–20′ tall, leafless above. Leaves about 1″ wide, much shorter than the culm, their margins somewhat involute; spikes 1–4, dense, erect, linear-cylindric, 5″–12″ long, 1½″ in diameter, the upper sessile and staminate below or throughout, the lowest stalked and subtended by an almost filiform bract; perigynia plano-convex, obovate, pale, less than 1″ long, minutely papillose, faintly few-nerved, very minutely beaked, the orifice entire; scales ovate, acute or mucronulate, dark brown with lighter margins, about as long as the perigynia; stigmas 3.

Hudson Bay to the Northwest Territory, south in the Rocky Mountains to Colorado. Summer.

48. Carex fúsca All. Brown Sedge. (Fig. 718.)

Carex fusca All. Fl. Ped. 2: 269. 1785.
Carex Buxbaumii Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 163. 1803.

Glabrous, culms slender, stiff, erect, sharp-angled, rough above, 1°–3° tall. Leaves rough, erect, 1″–2″ wide, shorter than or sometimes equalling or exceeding the culm; spikes 2–4, oblong or cylindric, erect, all sessile and close together or the lowest sometimes distant and very short-stalked, 4″–18″ long, about 4″ in diameter when mature, the terminal one staminate at the base or rarely throughout; perigynia elliptic or somewhat obovate, flat, ascending, 1″ long, very light green, faintly few-nerved, beakless, the apex minutely 2-toothed; scales ovate, awn-tipped, black or dark brown with a green midvein, longer than the perigynia; stigmas 3.

In bogs, Newfoundland to Alaska, south to Georgia, Kentucky, Utah and California. Also in Europe. May–July.

49. Carex stricta Lam. Tussock Sedge. (Fig. 719.)

Carex stricta Lam. Encycl. 3: 387. 1789.

Glabrous, rather dark green, culms slender, stiff, erect, usually in dense clumps, sharply 3-angled, rough above, 1½°–4° tall. Leaves long, rarely overtopping the culm, very rough on the margins, 1″–2″ wide, their sheaths becoming prominently fibrillose; lower bract similar, sometimes equalling the culm; staminate spikes solitary or sometimes 2, stalked; pistillate spikes 2–5, linear-cylindric, often staminate at the top, very densely flowered, or loose at the base, ½′–2′ long, about 2″ thick, erect or somewhat spreading, all sessile or the lower stalked; perigynia ovate-elliptic, ascending, acute, faintly few-nerved, 1″ long or less, minutely beaked, the orifice entire or nearly so; scales brown-purple with green margins and midvein, oblong or lanceolate, appressed; stigmas 2.

In swamps, Newfoundland to Ontario, south to Georgia and Texas. Hybridizes with *C. filiformis*. July–Sept.

Carex stricta angustàta (Boott) Bailey in A. Gray, Man. Ed. 6, 600. 1890.

Carex angustata Boott; Hook. Fl. Bor. Am. 2: 218. 1840.?

Pistillate spikes longer, 2′–4′ long, erect; scales lanceolate, acute, often longer than the perigynia. Range apparently nearly that of the type.

Carex stricta xerocàrpa (S. H. Wright) Britton, Bull. Torr. Club, 22: 222. 1895.

Carex xerocarpa S. H. Wright, Am. Journ. Sci. (II.) 42: 334. 1866.

Pistillate spikes almost filiform, about 1″ in diameter, erect. New York to Illinois.

50. Carex Hàydeni Dewey. Hayden's Sedge. (Fig. 720.)

Carex aperta Carey in A. Gray, Man. 547. 1848. Not Boott, 1840.

C. Haydeni Dewey, Am. Journ. (II.) 18: 103. 1854.

C. stricta var. *decora* Bailey, Bot. Gaz. 13: 85. 1888.

Glabrous, similar to *C. stricta* but smaller, culm slender, rough above, seldom over 2° high. Leaves 1″–1½″ wide, rough-margined, shorter than or sometimes a little overtopping the culm, their sheaths slightly or not at all fibrillose; lower bract foliaceous, about equalling the culm; pistillate spikes linear-cylindric, 6″–15″ long, about 2″ in diameter, erect or somewhat spreading, all sessile or nearly so, sometimes with a few staminate flowers at the summit; perigynia orbicular, obtuse, about ½″ broad, faintly 2–4-nerved, minutely beaked, the orifice entire; scales lanceolate, purplish, spreading, very acute, about twice as long as the perigynia; stigmas 2.

Swamps, New Brunswick to Rhode Island and Nebraska.

51. Carex Nebraskénsis Dewey. Nebraska Sedge. (Fig. 721.)

Carex Nebraskensis Dewey, Am. Journ. Sci. (II.) 18: 102. 1854.

Glabrous, culms rather stout, erect, sharp-angled, smooth, or rough above, 1°–2½° tall. Leaves pale green, 1½″–2½″ wide, rough-margined, not exceeding the culm, their sheaths more or less nodulose; lower bract foliaceous, sometimes equalling the culm, the upper much shorter and narrower; staminate spikes commonly 2, stalked; pistillate spikes 2–4, dense, oblong-cylindric, erect, 9″–15″ long, about 3″ in diameter, sessile or the lower short-stalked; perigynia ascending, elliptic or somewhat obovate, prominently several-ribbed when mature, short-beaked, the beak 2-toothed; scales ovate or lanceolate, acute or mucronate, brown with a green midvein or green all over, the upper shorter than the perigynia; stigmas 2.

Nebraska to Oregon and New Mexico. May–Aug.

52. Carex aquátilis Wahl. Water Sedge. (Fig. 722.)

Carex aquatilis Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 165. 1803.

Glabrous, glaucous and pale green, culms rather stout, erect, sharp-angled above, smooth or nearly so, 2°–4° tall. Leaves elongated, sometimes equalling the culm, 2″–3½″ wide, their sheaths nodulose; bracts similar to the leaves, the lower much overtopping the culm; staminate spikes 1–3, stalked; pistillate spikes narrowly linear-cylindric, often staminate at the summit, erect or slightly spreading, 1′–2½′ long, 2″–3″ in diameter, sessile and dense, or the lower narrowed and loosely flowered at the base and short-stalked; perigynia elliptic, green, nerveless, minutely beaked, the orifice entire; scales oblong, shorter than or equalling the perigynia and much narrower; stigmas 2.

In swamps and along streams, Newfoundland to Alaska, south to Massachusetts, Pennsylvania, Ohio, Minnesota and British Columbia. Also in Europe. June–Aug.

A hybrid between this species and *C. stricta* is described by Professor L. H. Bailey.

53. Carex lenticulàris Michx. Lenticular Sedge. (Fig. 723.)

Carex lenticularis Michx. Fl. Bor. Am. 2: 172. 1803.

Glabrous, pale green, culms very slender, erect, sharp-angled, slightly rough above, 1°–2° tall. Leaves elongated, rarely over 1″ wide, shorter than or rarely overtopping the culm, slightly rough-margined, their sheaths not fibrillose; lower bracts similar to the leaves, usually much overtopping the spikes; staminate spikes solitary or rarely 2, sessile or short-stalked, often pistillate above; pistillate spikes 2–5, clustered at the summit or the lower distant, sessile or the lower short-stalked, erect, linear-cylindric, 4″–1′ long, 1½″–2″ in diameter; perigynia ovate or elliptic, acute, minutely granulate, faintly few-nerved, appressed, tipped with a minute entire beak; scales green, appressed, shorter than the perigynia; stigmas 2.

On shores, Labrador to the Northwest Territory, south to Maine, Vermont, Ontario and Minnesota. Ascends to 4500 ft. in the White Mountains. June–Aug.

54. Carex Goodenòvii J. Gay. Goodenough's Sedge. (Fig. 724.)

Carex caespitosa Gooden. Trans. Linn. Soc. 2: 195. *pl. 21.* 1794. Not L. 1753.
C. Goodenovii J. Gay, Ann. Sci. Nat. (II.) 11: 191. 1839.
Carex vulgaris E. Fries, Mant. 3: 153. 1842.
Carex rigida var. *strictiformis* Bailey, Britton's Journ. Bot. 28: 172. 1890.

Glabrous, culms stiff, erect, sharp-angled, smooth or sometimes rough above, 1°–2° tall. Leaves elongated, smooth or nearly so, glaucous, 1″–2″ wide, not exceeding the culm, their sheaths not fibrillose; lower bracts usually foliaceous, sometimes equalling the culm; staminate spike sessile or stalked; pistillate spikes 2–4, all sessile or nearly so, erect, densely many-flowered, narrowly cylindric, 2″–2½″ in diameter, 5″–12″ long; perigynia flattened, broadly oval or ovate, faintly few-nerved, green, appressed, less than 1″ long, minutely beaked, the orifice nearly entire; scales purple-brown to black with a green midvein, very obtuse, shorter than the perigynia; stigmas 2.

In wet grounds, Newfoundland to Massachusetts and Pennsylvania. June–Aug.

55. Carex Bigelòvii Torr. Bigelow's Sedge. (Fig. 725.)

Carex Bigelovii Torr.; Schwein. Ann. Lyc. N. Y. 1: 67. 1824.
Carex hyperborea Drej. Rev. Crit. Car. 43. 1841.
Carex vulgaris var. *hyperborea* Boott, Ill. 167. 1867.

Glabrous and smooth throughout or very nearly so, culms sharp-angled, erect, 8′–18′ tall. Leaves 1½″–2″ wide, not exceeding the culm, the lower bracts similar, but shorter; sheaths slightly or not fibrillose; staminate spike stalked, sometimes pistillate at the base, pistillate spikes 2–4, linear-cylindric, loosely flowered at the base, dense above, 6″–12″ long, 1½″–2″ thick, the upper sessile, the lower often slender-stalked; perigynia oval, ascending, about 1″ long, very faintly nerved, scarcely beaked, the orifice entire; scales purple-brown with a narrow green midvein and often with green margins, obtuse or the lower acute, equalling or a little exceeding the perigynia; stigmas 2, rarely 3.

Greenland and Labrador to the higher mountains of northern New England and New York. Also in Europe. Summer.

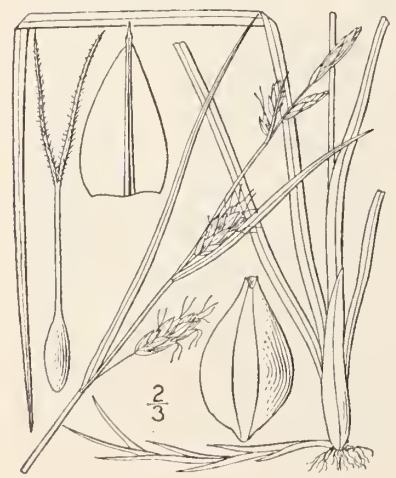
56. Carex subspathàcea Wormsk. Hoppner's Sedge. (Fig. 726.)

Carex subspathacea Wormsk. Fl. Dan. 9: 4. *pl. 1530.* 1818.
Carex Hoppneri Boott; Hook. Fl. Bor. Am. 2: 219. *pl. 220.* 1840.

Glabrous, culm stiff, smooth, 1′–7′ tall. Leaves rigid, smooth, about 1″ wide, often overtopping the culm; lower bracts foliaceous; staminate spike solitary, stalked; pistillate spikes 1–3, erect, sessile or very short-stalked, 3″–6″ long, about 1½″ in diameter; perigynia oval or ovoid, very short beaked, pale green, faintly few-nerved, about 1″ long; scales ovate or ovate-oblong, obtuse or acute, shorter than or equalling the perigynia; stigmas 2.

Greenland to Hudson Bay. Summer.

57. Carex salìna Wahl. Salt-marsh Sedge. (Fig. 727.)



Carex salina Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 165. 1803.

Glabrous, culm slender, smooth, erect, 6′–18′ tall. Leaves very narrowly linear, ½″–1″ wide, sometimes overtopping the culm, the lower bract similar; staminate spikes 1 or 2, stalked; pistillate spikes 1–3, slender-stalked or the upper sessile, erect, loosely few-several-flowered, ½′–1′ long, 1½″–2″ thick; perigynia ovate-elliptic, pale, faintly few-nerved, ascending, 1½″ long, tapering into a very short entire beak; scales ovate, brown with a green midvein, acute or cuspidate, somewhat longer than the perigynia; stigmas 2.

In salt marshes, Greenland to Hudson Bay. Also in arctic Europe. Summer.

58. Carex cuspidàta Wahl. Cuspidate Sedge. (Fig. 728.)

Carex cuspidata Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 164. 1803.
Carex salina var. *cuspidata* Wahl. Fl. Lapp. 246. 1812.

Glabrous, culms rather stout, smooth or rough above, erect, 1°–2½° tall. Basal leaves often equalling the culm, 1½″–3″ wide, smooth, their sheaths more or less nodulose; leaves of the culm shorter, similar to the lower bracts, which usually overtop the spikes; staminate spikes 1–3, stalked; pistillate spikes 2–4, narrowly cylindric, often staminate at the summit, erect, the upper often sessile, the lower stalked; perigynia elliptic, green, 2–4-nerved, with a very short entire beak; scales lanceolate, pale, acuminate or abruptly contracted into a serrate awn, much longer than the perigynia; stigmas 2.

In marshes, Labrador to the coast of Massachusetts. Also in Europe. Summer.

59. Carex tórta Boott. Twisted Sedge. (Fig. 729.)

Carex torta Boott; Tuckerm. Enum. Meth. 11. 1843.

Glabrous, rather light green, culm very slender, erect or reclining, smooth or slightly scabrous above, 1½°–3° long. Leaves about 2″ wide, the basal shorter than or equalling the culm, those of the culm very short; sheaths not fibrillose; lower bract commonly foliaceous; staminate spikes 1–3, stalked; pistillate spikes 3–5, all but the upper spreading or drooping, linear, 1′–3′ long, about 2″ in diameter, sometimes compound, often loosely flowered toward the base; perigynia oblong or narrowly ovate, green, nerveless, narrowed and more or less twisted above, 1″–1½″ long; scales ovate, obtuse or subacute, purple-brown with a green midvein, shorter and mostly narrower than the perigynia; stigmas 2.

In marshes and wet thickets, Maine and Vermont to North Carolina and Missouri. Ascends to 2600 ft. in Virginia. June–July.

60. Carex prásina Wahl. Drooping Sedge. (Fig. 730.)

Carex prasina Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 161. 1803.
Carex miliacea Muhl.; Willd. Sp. Pl. 4: 290. 1805.

Glabrous, rather light green, culm slender, smooth or nearly so, reclining, sharply 3-angled, 1°–2½° long. Leaves shorter than or equalling the culm, flaccid, roughish, 1½″–2½″ wide; lower bract similar, commonly overtopping the spikes; staminate spike solitary, short-stalked, often pistillate at the summit; pistillate spikes 2 or 3, narrowly linear-cylindric, drooping, the lower filiform-stalked, the upper sometimes nearly sessile, 1′–2½′ long, 2″ in diameter, rather loosely many-flowered; perigynia light green, lanceolate, very obscurely nerved, tapering into a slender minutely 2-toothed beak; scales ovate, acute, acuminate, or short-awned, pale green, shorter than the perigynia; stigmas 3.

In meadows and moist thickets, Vermont and Ontario to New Jersey and Pennsylvania, south in the Alleghanies to Georgia. Ascends to 4200 ft. in Virginia. May–July.

61. Carex misándra R. Br. Short-leaved Sedge. (Fig. 731.)

Carex misandra R. Br. Suppl. Parry's Voy. cclxxxiii. 1824.

Glabrous and smooth, culms very slender, erect, 1′–15′ tall. Leaves 1″–1½″ wide, clustered at the base, usually much shorter than the culm, seldom over 2½′ long; bracts narrowly linear, sheathing, not overtopping the spikes; terminal spike often partially pistillate at base or summit, slender-stalked; pistillate spikes 1 or 2, filiform-stalked, 3″–7″ long, about 2″ thick, rather few-flowered, drooping; perigynia narrowly lanceolate, acuminate at the apex, narrowed at the base, 1½″ long, ascending, dark brown, denticulate above; scales oval, obtuse, purple-black with narrow white margins, somewhat shorter than the perigynia; stigmas 2 or 3.

Throughout arctic America, extending south in the Rocky Mountains to the higher summits of Colorado. Also in arctic Europe and Asia. Summer.

62. Carex littoràlis Schwein. Barratt's Sedge. (Fig. 732.)

Carex littoralis Schwein. Ann. Lyc. N. Y. 1: 70. 1824.
Carex Barrattii Schwein. & Torr. Ann. Lyc. N. Y. 1: 361. 1825.

Glabrous, pale green and somewhat glaucous, culms erect, slender, smooth, 1°–2° tall, leafless above. Leaves 1½″–2″ wide, smooth, usually much shorter than the culm, the lower sheaths fibrillose; bracts not sheathing, the lower usually short and narrow, sometimes elongated and overtopping the culm; staminate spikes 1–3, usually rather long-stalked; pistillate spikes 2–4, drooping or the upper ascending, slender-stalked, linear-cylindric, ½′–2′ long, 3″ in diameter, mostly staminate at the summit; perigynia oblong, green, faintly few-nerved, 1″–1½″ long, tipped with a minute entire beak; scales brown-purple with lighter margins, obtuse, equalling or shorter than the perigynia; stigmas 3.

In pine-barren swamps, eastern Long Island and New Jersey to North Carolina. May–July.

63. Carex rariflòra J. E. Smith. Loose-flowered Alpine Sedge. (Fig. 733.)

Carex rariflora J. E. Smith, Engl. Bot. *pl. 2516.* 1813.

Glabrous, culms very slender, rather stiff, erect, 4′–12′ tall, smooth, or roughish above. Leaves 1″ wide or less, shorter than the culm, the lower very short; bracts subulate, purple at the base; staminate spike solitary, long-stalked, sometimes with a few pistillate flowers at the base; pistillate spikes 1 or 2, narrowly oblong, few-flowered 3″–6″ long, 2″ in diameter, nodding on filiform stalks; perigynia pale, oblong, acute at each end, 1½″ long, ½″ wide, minutely beaked, few-nerved, the orifice entire; scales oval, purple-brown with a greenish midvein, obtuse or mucronate, equalling or a little longer than the perigynia; stigmas 3.

In wet places, Greenland and Labrador to Hudson Bay, south to Mt. Katahdin, Maine, and to northern Minnesota. Also in Europe and Asia. Summer.

64. Carex limòsa L. Mud Sedge. (Fig. 734.)

Carex limosa L. Sp. Pl. 977. 1753.

Glabrous, rather light green, culms slender, rough above, erect, 10′–2° tall. Leaves 1″ wide or less, shorter than the culm, the midvein prominent, the margins somewhat involute in drying; bracts linear-filiform, the lower ½′–1½′ long; staminate spike solitary, long-stalked; pistillate spikes 1 or 2, filiform-stalked and drooping, oblong, 5″–10″ long, about 3″ thick; perigynia pale, oval, narrowed at both ends, 1½″ long, ascending, tipped with a minute entire beak, several-nerved, about as long as the oval green or purplish-brown cuspidate or acute scale; stigmas 3.

In bogs, Labrador to the Northwest Territory, south to Maine, New Jersey, Ohio, Minnesota and Idaho. Ascends to 4000 ft. in the White Mountains. Also in Europe. Summer.

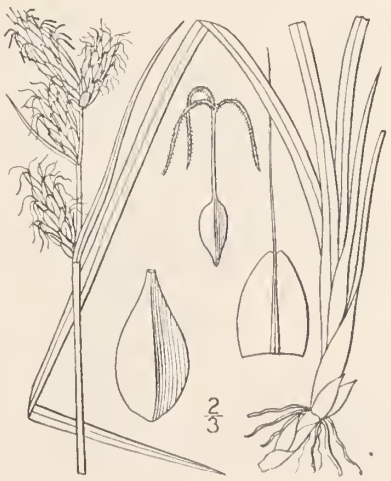
65. Carex Magellánica Lam. Magellan Sedge. (Fig. 735.)

Carex Magellanica Lam. Encycl. 3: 385. 1789.
Carex irrigua Smith; Hoppe, Caric. 72. 1826.

Glabrous, culms slender, smooth or nearly so, erect or reclining, 6′–2° tall. Leaves flat, 1″–2″ wide, somewhat rough on the margins, commonly shorter than the culm, the lower bract similar and usually overtopping the spikes; staminate spike solitary, or rarely 2, often partially pistillate; pistillate spikes 1–3, oblong, filiform-stalked and drooping, 4″–8″ long, about 3″ in diameter; perigynia biconvex, oval, pale, minutely granulate-papillose, oval or suborbicular, few-nerved, 1″–1½″ long, tipped with a very minute beak, the orifice entire; scales lanceolate, long-acuminate or awned, dark green or purplish-brown, 1½–2 times as long as the perigynia; stigmas 3.

In bogs, Newfoundland and Labrador to Manitoba, south to Maine, Pennsylvania and Michigan. Also in the Uinta Mountains, Utah, in Europe, and in southern South America. Ascends to 4600 ft. in the Adirondacks. Summer.

66. Carex podocàrpa R. Br. Long-awned Arctic Sedge. (Fig. 736.)



Carex podocarpa R. Br. Frank. Journ. App. Ed. 2, 36. 1823.

Glabrous, culms very slender, erect or reclining, rough above, 10′–2° long. Leaves a little rough on the margins, 1½″–2″ wide, shorter than the culm, the lowest reduced to short sheaths; lower bract similar to the upper leaves, the upper much shorter and narrower; staminate spikes 1 or 2, stalked; pistillate spikes 2–4, cylindric, dense, many-flowered, ½′–1½′ long, 3″ in diameter, stalked or sessile, the lower often nodding; perigynia elliptic-lanceolate, flat, about 2½″ long, acute at both ends, appressed, faintly nerved, the orifice entire; scales purple-black, ovate, acuminate, longer than the perigynia, the midvein produced into a subulate awn 2″–6″ long; stigmas 2 or 3.

Arctic America. Closely related to *C. atrofusca* Schk. Summer.

67. Carex cryptocàrpa C. A. Meyer. Hidden-fruited Sedge. (Fig. 737.)

Carex cryptocarpa C. A. Meyer, Mem. Acad St. Petersb. 1: 226. *pl. 14.* 1825–31.

Glabrous, culm stout, erect, sharply 3-augled, rough above, 1½°–3° tall. Leaves smooth, 2″–3″ wide, the basal shorter than or equalling the culm, the upper ones and the lower bract shorter; staminate spikes 2–4, stalked; pistillate spikes 2–5, all filiform-stalked and drooping, densely flowered, 1′–3′ long, 3″–4″ in diameter; perigynia oblong or oval, green, faintly several-nerved, 1½″ loug, tipped with a very short entire beak; scales purple-brown, ascending, lanceolate, acumiuate, 2 or 3 times longer than the perigynia; stigmas 2.

Arctic America from Greenland to Alaska. Summer.

Carex cryptocàrpa variegàta (Drejer) Britton, Mem. Torr. Club, 5: 76. 1894.
Carex filipendula var. *variegata* Drejer, Rev. Crit. Car. 46. 1841.

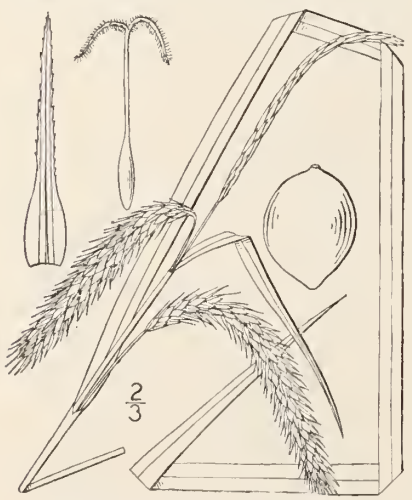
Lower than the type, seldom over 1° tall; pistillate spikes about 2, ovoid or short oblong, 6″–9″ long; scales ovate-lanceolate, acute, little longer than the perigynia. Range of the species.

68. Carex maritima Muller. Seaside Sedge. (Fig. 738.)

C. maritima Muller, Fl. Dan. 4: 12: 6. *pl. 703.* 1777.

Glabrous, light green, culms sleuder, or rather stout, erect, sharply 3-angled, smooth, or roughish above, 1°–2½° tall. Leaves 2″–3″ wide, roughish on the margins and midvein, rarely overtopping the culm, the lower bracts similar; staminate spikes 1–3, slender-stalked, often pistillate at the base; pistillate spikes 2–4, cylindric, often staminate at the summit, densely many-flowered, 1′–3′ long, 4″–6″ thick, drooping on filiform stalks; perigynia oval or nearly orbicular, ascending, pale, biconvex, rather less than 1″ long, uerveless or with a few faint nerves, tipped with a very short and nearly or quite entire beak; scales ascending, green, linear-subulate, ciliate-scabrous, 3–8 times as long as the perigynia; stigmas 2.

In salt meadows, Newfoundland and Labrador to Massachusetts. Also in Europe. June–Aug.



69. Carex crinita Lam. Fringed Sedge. (Fig. 739.)

Carex crinita Lam. Encycl. 3: 393. 1789.

Glabrous, culms stout, 3-angled, rough or very nearly smooth, erect or somewhat recurving, 2°–5° tall. Leaves flat, rough-margined, 3″–5″ wide, the upper sometimes overtopping the culm, the lowest very short and sheathing; staminate spikes 1 or 2, stalked, often pistillate at the base or in the middle; pistillate spikes 3–5, narrowly cylindric, densely many-flowered, 1′–4½′ long, 3″–4″ in diameter, all stalked, drooping and commonly secund; perigynia obovoid, obtuse, about 1″ long and nearly as thick, nerveless, abruptly tipped by the very short entire beak; scales green, subulate, ciliate-scabrous, spreading, 2–6 times as long as the perigynia; stigmas 2.

In swamps and wet woods, Nova Scotia and Ontario to Florida and Texas. June–Aug.
A hybrid with *C. torta*, occurring in New Hampshire, is described by Prof. L. H. Bailey.

Carex crinita mìnor Boott. Ill. 18. 1858.

Culms slender, 10′–20′ tall; leaves 1½″–2½″ wide; pistillate spikes 1′–1½′ long, 2″ thick, spreading or slightly drooping; perigynia little more than ½″ in diameter. Maine to southern New York.

70. Carex gynándra Schwein. Nodding Sedge. (Fig. 740.)

Carex gynandra Schwein. Ann. Lyc. N. Y. 1: 70. 1824.
Carex crinita var. *gynandra* Schwein. & Torr. Ann. Lyc. N. Y. 1: 360. 1825.

Similar to the preceding species, culms stout, 2°–4° tall. Leaves 3″–6″ wide, glabrous or their sheaths often finely pubescent; pistillate spikes 1′–4′ long, narrowly cylindric, stalked, drooping; perigynia oblong or elliptic, faintly few-nerved or nerveless, compressed, not at all or slightly inflated, 1½″–2″ long, and about one-half as broad, tapering gradually to an acute entire orifice; scales subulate, rough, ascending, 2–4 times as long as the perigynia; stigmas 2, rarely 3.

In swamps, Nova Scotia (according to Macoun) to northern New York, Florida and Louisiana. Ascends to 5000 ft. in New Hampshire. June–Aug.

Carex gynándra Pòrteri (Olney) Britton.

Carex Porteri Olney, Car. Bor. Am. 12. 1871.

Smaller, bearing the same relation to the species that *minor* does to *C. crinita*. Maine.

71. Carex macrokòlea Steud. Southern Glaucous Sedge. (Fig. 741.)

Carex macrokolea Steud. Syn. Pl. Cyp. 223. 1855.
Carex verrucosa Ell. Bot. S. C. & Ga. 2: 555. 1824. Not Muhl. 1817.

Glabrous, light green and glaucous, culms stout, erect, slightly rough on the angles above, 2°–4° tall. Leaves flat or in drying somewhat involute, rough, 1½″–3″ wide, often equalling the culm, tapering to a very long narrow tip, the lower bracts similar, shorter; staminate spikes 1 or 2, short-stalked, often pistillate at the summit; pistillate spikes 2–8, cylindric, dense, 1′–2′ long, erect, sessile or the lower stalked; perigynia dark brown, broadly ovoid, 3-angled, 1½″ long, usually several-nerved, abruptly contracted into a sharp beak about one-fourth as long as the body; scales oblong, scarious-margined, rough-awned, as long as the perigynia or longer; stigmas 2 or 3.

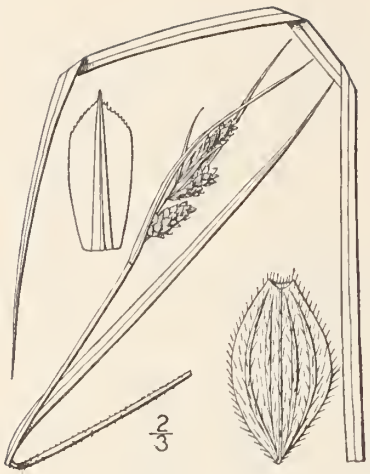
In swamps, Missouri to Florida and Texas. June–Aug.

72. Carex glaùca Scop. Glaucous Sedge. (Fig. 742.)

Carex glauca Scop. Fl. Carn. Ed. 2, 2: 223. 1772.

Glabrous, pale green and glaucous, culms slender, erect, smooth or roughish above, 1°–2° tall, the rootstocks long and stout. Leaves shorter than or equalling the culm, smooth or nearly so, about 2″ wide; lower bract similar to the leaves, but narrower; staminate spikes mostly 2, stalked; pistillate spikes 2 or 3, ascending or at length drooping, slender-stalked, linear-cyliudric, 1′–2′ long, 3″ thick, densely many-flowered, commouly staminate at the summit; perigynia browu, ellipsoid, faiutly few-nerved, or nerveless, minutely grauulate or papillose, nearly 1″ long, minutely beaked, the orifice entire; scales ovate or lanceolate, brown with a green midvein, acute or obtusish, about as long as the perigynia; stigmas 2.

In meadows, Nova Scotia and Ontario. Adventive from Europe. June–Aug.



73. Carex viréscens Muhl. Downy Green Sedge. (Fig. 743.)

Carex virescens Muhl.; Willd. Sp. Pl. 4: 251. 1805.

Culms very slender, erect or somewhat reclining, rough above, 6′–18′ tall. Leaves light green, pubescent, especially on the sheaths; spikes 2–5, very short-stalked, erect or nearly so, oblong-cylindric, densely many-flowered, 4″–10″ long, about 1½″ in diameter, the terminal one staminate below; perigynia 3-sided, broadly oval or ovoid, rather less than 1″ long, ascending, densely pubescent, few-nerved, green, beakless, the orifice entire; scales oblong-ovate, cuspidate by the excurrent midvein, scarious-margined, slightly shorter than the perigynia; stigmas 3.

In dry woods and thickets, Maine and Ontario to Michigan, south to North Carolina and Missouri. Ascends to 2000 ft. in Pennsylvania. June–July.

74. Carex costellàta Britton. Ribbed Sedge. (Fig. 744.)

Carex costata Schwein. Ann. Lyc. N. Y. 1: 67. 1824. Not Presl. 1819.
Carex virescens var. *costata* Dewey, Am. Journ. Sci. 9: 260. 1825.
C. costellata Britton, Bull. Torr. Club, 22: 223. 1895.

Similar to the preceding species, but taller and more spreading; culms slender, 1°–2½° long. Leaves 1½″–2″ wide, pubescent, especially on the sheaths, shorter than the culm, the upper one and the similar lower bract sometimes overtopping the spikes; spikes 2–5, narrowly cylindric, many-flowered, rather loose, ½′–1½′ long, 1½″ in diameter, erect or slightly spreading, the terminal one staminate below, the lower one commonly filiform-stalked; perigynia oblong, densely pubescent, narrowed at each end, strongly several-ribbed, 1″ long, rather more than ½″ thick, beakless, the orifice entire; scales ovate, scarious-margined, acuminate or cuspidate, shorter than the perigynia; stigmas 3.

In woods, Maine and Ontario to North Carolina, where it ascends to 4000 ft. June–Aug.

75. Carex trìceps Michx. Hirsute Sedge. (Fig. 745.)

Carex triceps Michx. Fl. Bor. Am. 2: 170. 1803.
Carex hirsuta Willd. Sp. Pl. 4: 252. 1805.
Carex triceps var. *hirsuta* Bailey, Mem. Torr. Club, 1: 35. 1889.

Light green, culms slender, rough above, erect or reclining, 6′–3½° long. Leaves 1″–2″ wide, pubescent, at least on the sheaths, shorter than the culm, the lower bract similar; spikes 2–5, oblong or oblong-cylindric, dense, erect, sessile or very nearly so, 3″–8″ long, 2½″–3½″ in diameter, usually clustered at the summit, the terminal one staminate at the base; perigynia oval or obovoid, flattened, not inflated, green or greenish-brown, few-nerved, imbricated, usually pubescent when young, when mature ½″–1″ long, beakless, the orifice minutely notched or entire; scales ovate, scarious-margined, cuspidate or short-awned, rather shorter than the perigynia; achene elliptic-obovoid, its summit not bent; stigmas 3.

In woods, fields and swamps, Massachusetts to southern Ontario and Michigan, south to Florida and Texas. Ascends to 2500 ft. in Virginia. April–Aug.

76. Carex Caroliniàna Schwein. Carolina Sedge. (Fig. 746.)

Carex Caroliniana Schwein. Ann. Lyc. 1: 67. 1824.
Carex Smithii Porter; Olney, Car. Bor. Am. 2, name only. 1871. Not Tausch. 1821.
C. triceps var. *Smithii* Bailey, Bot. Gaz. 13: 88. 1888.

Culms very slender, erect, rough above, 1°–2½° tall. Leaves 1″–1½″ wide, rather dark green, glabrous except on the sheaths, the upper and the similar but narrower bracts usually much overtopping the spikes; spikes 2–4, oblong, dense, sessile or nearly so, 4″–6″ long, 2″ in diameter; erect, clustered at the summit, the upper one staminate at the base; perigynia subglobose or obovoid, swollen, not imbricated, about ½″ in diameter, nerveless or faintly nerved, brown, beakless, glabrous at least when mature, the orifice entire; scales brown, ovate, mucronate; achene pyriform, bent at the summit or tipped with the bent style.

In meadows, New Jersey and Pennsylvania to North Carolina and Arkansas. May–July.

77. Carex gracíllima Schwein. Graceful Sedge. (Fig. 747.)

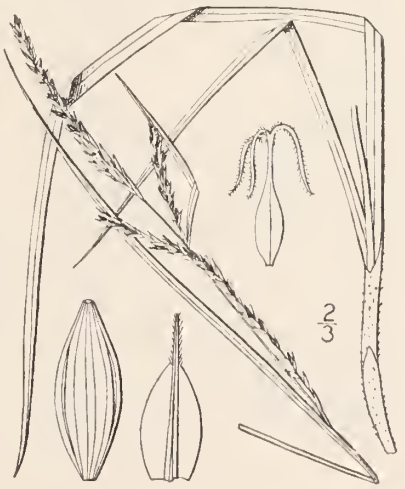
Carex gracillima Schwein. Ann. Lyc. N. Y. 1: 66. 1824.
Carex gracillima var. *humilis* Bailey, Mem. Torr. Club, 1: 71. 1889.

Glabrous, culms slender, erect or spreading, roughish above, 1°–3° long. Leaves dark green, 1½″–3″ wide, shorter than the culm, the basal ones wider than the upper; lower bract foliaceous, sometimes overtopping the spikes; spikes 3–5, narrowly cylindric, usually densely flowered except at the base, 1′–2½′ long, about 2″ thick or sometimes much smaller, filiform-stalked and drooping, the upper one partly or wholly staminate; perigynia ovoid-oblong, obtuse, slightly swollen, few-nerved, glabrous, 1″ long; scales thin, ovate-oblong, very obtuse or the lower cuspidate, pale, scarious-margined, one-half as long as the perigynia; stigmas 3.

In moist woods and meadows, Nova Scotia to Manitoba, North Carolina, Ohio and Michigan. May–July.

Professor Bailey has described a hybrid with *C. hirsuta*, occurring at Phillipstown, N. Y. Carex Sullivántii Boott, is a hybrid of this species with *C. pubescens*.

78. Carex aestivàlis M. A. Curtis. Summer Sedge. (Fig. 748.)



Carex aestivalis M. A. Curtis; A. Gray, Am. Journ. Sci. 42: 28. 1842.

Culms very slender or filiform, erect or nearly so, smooth, or roughish near the summit, 1°–2° tall. Leaves flat, 1″–1½″ wide, elongated but usually shorter than the culm, their sheaths usually pubescent, the blades sometimes slightly so; lower bracts similar to the leaves but narrower; spikes 3–5, narrowly linear, erect or somewhat spreading, 1′–2′ long, about 1½″ thick, loosely many-flowered or the upper ones dense, the terminal one staminate at the base or also at the summit; perigynia oblong, pointed at both ends, 3-sided, glabrous, few-nerved, 1″ long, ½″ thick, beakless, the orifice entire; scales ovate-oblong, obtuse, or the lower cuspidate or short-awned, green, thin, one-half as long as the perigynia or more; stigmas 3.

In mountain woods, Massachusetts and northern New York to Georgia. June–Aug.

79. Carex oxýlepis Torr. & Hook. Sharp-scaled Sedge. (Fig. 749.)

Carex oxylepis Torr. & Hook. Ann. Lyc. N. Y. 3: 409. 1836.

Culms slender, smooth, erect, 1°–2° tall. Leaves flat, 1½″–3″ wide, pubescent, especially on the sheaths, shorter than or equalling the culm, the lower bract similar but narrower; spikes 4 or 5, linear-cylindric, 1′–2′ long, about 2″ in diameter, rather densely many-flowered, filiform-stalked and at maturity spreading or drooping, the terminal one staminate at the base or sometimes wholly staminate; perigynia oblong, sharply 3-angled, pointed at both ends, slightly swollen, 2″ long, less than 1″ thick, several-nerved, the orifice entire; scales ovate-lanceolate with broad white scarious margins, short-awned, about one-third shorter than the perigynia, the awn scabrous; stigmas 3.

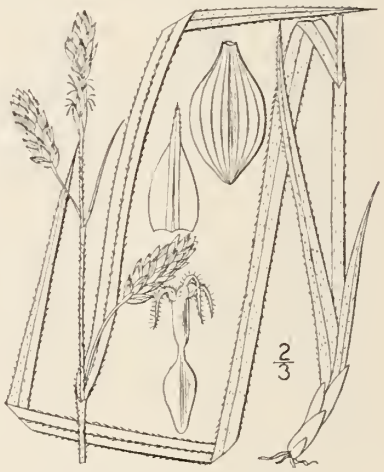
Southern Missouri to Tennessee and South Carolina, south to Texas and Florida. April–May.

80. Carex formòsa Dewey. Handsome Sedge. (Fig. 750.)

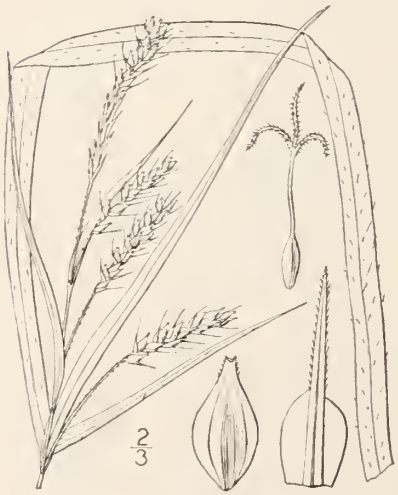
Carex formosa Dewey, Am. Journ. Sci. 8: 98. 1824.

Culms slender, smooth, erect, 1°–2½° tall. Leaves flat, pubescent, especially on the sheaths, the basal 2″–3″ wide, often as long as the culm; lower bract similar to the shorter culm-leaves; spikes 3–5, oblong-cylindric, dense, ½′–1¼′ long, nearly 3″ in diameter, filiform-stalked, spreading or drooping, the lower distant, the upper one staminate at the base; perigynia ovoid, glabrous, ascending, swollen, faintly few-nerved, 2″ long, 1″ thick, tipped with a very short and slightly notched beak; scales lanceolate or ovate, green, with scarious margins, acute, cuspidate or the lower short-awned, shorter than the perigynia or the lower equalling them; stigmas 3.

In dry woods and thickets, Massachusetts and Vermont to southern Ontario, New York and Michigan. June–July.



81. Carex Davísii Schwein. & Torr. Davis' Sedge. (Fig. 751.)



Carex Davisii Schwein. & Torr. Ann. Lyc. N. Y. 1: 326. 1825.
Carex Torreyana Dewey, Am. Journ. Sci. 10: 47. 1826.

Similar to the preceding species, culms stouter, 1½°–3° tall. Leaves 1½″–3″ wide, flat, pubescent, especially on the sheaths, the basal ones often as long as the culm; lower bract foliaceous, commonly overtopping the spikes; spikes 3–5, clustered near the summit or the lower one distant, dense, ½′–1½′ long, 3″ in diameter, all filiform-stalked and at length spreading or drooping, the terminal one staminate at the base; perigynia ovoid, much swollen, glabrous, strongly several-nerved, 2″–2½″ long, rather more than 1″ thick, tipped with a very short but conspicuously 2-toothed beak; scales lanceolate or oval, long-awned, spreading, equalling or longer than the perigynia; stigmas 3.

In moist thickets and meadows, Massachusetts to New York and Minnesota, south to Georgia, Kentucky and the Indian Territory. May–July.

82. Carex longiróstris Torr. Long-beaked Sedge. (Fig. 752.)

Carex longirostris Torr.; Schwein. Ann. Lyc. N. Y. 1: 71. 1824.

Glabrous, light green, culms very slender, roughish above, erect or reclining, 10′–3° long. Leaves flat, slightly scabrous, 1″–1½″ wide, usually not exceeding the culm, the bracts similar, shorter, sometimes overtopping the spikes; staminate spikes 1–3, slender-stalked, rarely pistillate at the base; pistillate spikes 2–4, oblong-cylindric, loosely flowered, ½′–2′ long, 3″–4″ in diameter, all filiform-stalked and nodding or the upper one nearly sessile; perigynia broadly oval, spreading, smooth, slightly inflated, pale, strongly 1-nerved on each side, the body about 1″ long, contracted into a very slender beak of nearly twice its length; scales lanceolate, spreading, long-acuminate, scarious-margined, 3″–4″ long; stigmas 3.

On banks and in moist thickets, New Brunswick to Ontario and the Northwest Territory, south to Massachusetts, Pennsylvania, Michigan and Nebraska. June–Sept.

Carex longirostris minor Boott, seems to be but a dwarf form of the species.

83. Carex Assiniboinénsis W. Boott. Assiniboia Sedge. (Fig. 753.)

Carex Assiniboinensis W. Boott, Coult. Bot. Gaz. 9: 91. 1884.

Glabrous and nearly smooth, culms filiform, reclining, 2°–2½° long, longer than the leaves. Leaves and bracts 1″ or less wide, the lower reduced to short purplish sheaths; staminate spike long-stalked; pistillate spikes 2 or 3, distant, loosely few-flowered, 7″–15″ long, drooping on filiform stalks; the flowers alternate; perigynia very narrowly conic, appressed, obtusely 3-angled, subulate-beaked, above 3″ long and 1″ thick above the base, densely tuberculate-hispid, narrowed into a short stalk; scales lanceolate, scarious-margined, awned, about the length of the perigynia; stigmas 3.

In wet soil, northern Minnesota and Manitoba. Summer.

84. Carex castànea Wahl. Chestnut Sedge. (Fig. 754.)

Carex castanea Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 155. 1803.

Carex flexilis Rudge, Trans. Linn. Soc. 7: 98. *pl. 10.* 1804.

Culms slender or filiform, nearly erect, rough above, 1°–3° tall. Leaves 1½″–2½″ wide, pubescent, shorter than the culm; bracts linear-filiform, ½′–1½′ long; staminate spike stalked; pistillate spikes 1–4, oblong or oblong-cylindric, rather loosely flowered, ½′–1′ long, about 3″ thick, drooping on filiform stalks, sometimes close together at the summit; perigynia glabrous, pale brown, ascending, oblong or oblong-lanceolate, 3-angled, few-nerved, tapering gradually into a 2-toothed beak one-half as long as the body, scales thin, ovate or ovate-lanceolate, acute or cuspidate, lacerate or entire, rather shorter than the perigynia; stigmas 3.

In dry thickets and on banks, Newfoundland to Connecticut, west to Minnesota. June–July.

85. Carex capillàris L. Hair-like Sedge. (Fig. 755.)

Carex capillaris L. Sp. Pl. 977. 1753.

Glabrous, culms slender or filiform, smooth or roughish above, erect, 2′–14′ tall. Leaves ½″–1″ wide, much shorter than the culm, flat or somewhat involute in drying, roughish; lower bract similar, the upper much narrower, all sheathing; spikes all filiform-stalked, the terminal one staminate; pistillate spikes 1–3, narrowly oblong, 2″–6″ long, 1″ thick, nodding, 2–12-flowered; perigynia oblong, 3-angled, light green, almost nerveless, about 1″ long, rather less than ½″ thick, the slender beak about one-third as long as the body; scales oval, scarious-margined, shorter than the perigynia; stigmas 3.

Greenland to Alaska, Maine, the White Mountains, northern New York, Michigan, and in the Rocky Mountains to Colorado and Utah. Also in Europe and Asia.

86. Carex arctàta Boott. Drooping Wood Sedge. (Fig. 756.)

Carex arctata Boott; Hook. Fl. Bor. Am. 2: 227. 1840.

Glabrous, culms slender, erect or reclining, 1°–2½° long, roughish above. Leaves flat, roughish-margined, much shorter than the culm, the basal ones 3″–5″ wide; staminate spike solitary, short-stalked; pistillate spikes 2–5, linear, 1′–3′ long, 1½″ thick, loosely many-flowered, erect, ascending, or at length drooping and filiform-stalked, the lower one usually remote; perigynia oblong, or thickest below the middle, rather strongly few-nerved, narrowed at each end, about 2″ long, less than 1″ thick, 3-angled, tapering into a short 2-toothed beak; scales ovate, cuspidate or short-awned, about one-third shorter than the perigynia; stigmas 3.

In dry woods and thickets, New Brunswick to Minnesota, south to Pennsylvania and Michigan. May–June.

Carex Kniéskerni Dewey, is probably a hybrid with *C. castanea* or *C. formosa*.

Carex arctàta Fáxoni Bailey, Coult. Bot. Gaz. 13: 87. 1888.

Spikes nearly erect, 2–4 of them clustered near the summit, usually shorter, the staminate one very short; perigynia 2″–2½″ long. Quebec to New Hampshire, Minnesota and Michigan.

87. Carex ténuis Rudge. Slender-stalked Sedge. (Fig. 757.)

Carex tenuis Rudge, Trans. Linn. Soc. 7: 97. *pl. 9.* 1804.
Carex debilis Boott, Ill. *pl. 272.* 1860. Not Michx. 1803.
C. debilis var. *Rudgei* Bailey, Mem. Torr. Club, 1: 34. 1889.

Culms slender, rough above, erect or commonly reclining, 4′–3° long. Leaves shorter than the culm or equalling it, light green, 1½″–2½″ wide; lower bracts similar to the culm-leaves, sometimes overtopping the spikes; staminate spike short-stalked; pistillate spikes 2–5, linear, 1′–3′ long, 1½″ thick, filiform-stalked and spreading or drooping; perigynia spindle-shaped, glabrous or puberulent, faintly few-nerved, obtusely 3-angled, 3″ long, less than 1″ thick, tapering into a short 2-toothed beak; scales ovate or oblong, acute, cuspidate or obtuse, scarious-margined, one-half as long as the perigynia; stigmas 3.

In woods, Newfoundland to Michigan, Virginia, the mountains of North Carolina and Kentucky. May–Aug.

A hybrid with *C. virescens* occurs at Revere, Mass.

Carex ténuis interjécta (Bailey) Britton.
Carex debilis var. *interjecta* Bailey, Bull. Torr. Club, 20: 418. 1893.

Pistillate spikes very slender, often compound at the base, erect or nearly so, filiform-stalked, very loosely flowered, the perigynia alternate, only about 2″ long. New York and Pennsylvania.

Carex tenuis erectior Britton.

Carex debilis var. *strictior* Bailey, Mem. Torr. Club, 1: 34. 1889. Not *C. strictior* Dewey, 1846.

Mostly taller and stouter than the type, and erect; leaves about 2″ wide; pistillate spikes erect or but slightly spreading; perigynia 2½″ long, one-third longer than the scales. White Mountains.

88. Carex oblìta Steud. Dark-green Sedge. (Fig. 758.)

Carex oblita Steud. Syn. Pl. Cyp. 231. 1855.
Carex glabra Boott, Ill. 93. 1860.
Carex venusta var. *minor* Boeckl. Linnaea, 41: 255. 1876.

Glabrous, culms slender, erect or reclining, sharply 3-angled, smooth or very nearly so, 1°–3° long. Leaves 2″–2½″ wide, shorter than the culm, slightly rough; lower bract similar to the culm-leaves but narrower, sometimes overtopping the spikes; staminate spike solitary, filiform-stalked, sometimes partially pistillate; pistillate spikes 3–5, narrowly cylindric, 1′–2½′ long, about 2½″ thick, loosely flowered, slender-stalked, the upper mostly close together and spreading or ascending, the lower distant, drooping; perigynia dark green, 3-angled, glabrous, 3″ long, less than 1″ thick, ascending, rather strongly many-nerved, tapering into a short 2-toothed beak; scales obtuse, about one-third the length of the perigynia; stigmas 3.

In bogs, central New York and Pennsylvania to New Jersey and North Carolina. June–Aug.

89. Carex grísea Wahl. Gray Sedge. (Fig. 759.)

Carex grisea Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 154. 1803.

Glabrous, culms rather stout, erect or somewhat spreading, smooth or nearly so throughout, 1°–2½° long. Leaves light green and sometimes slightly glaucous, flat, 2″–3½″ wide, the basal shorter than or equalling the culm; bracts similar to the leaves, spreading, much overtopping the spikes; staminate spikes solitary, sessile; pistillate spikes 3–5, dense, oblong, several–many-flowered, 4″–12″ long, about 2″ thick, the upper usually sessile and close together, the lower slender-stalked and distant; perigynia oblong, 2½″ long, 1″ thick, nearly terete or irregularly angled by overlapping, subacute but beakless, finely many-striate, longer or the lower equalling or shorter than the ovate scarious-margined cuspidate or awned scales; stigmas 3.

In woods and thickets, Maine to Ontario and Minnesota, south to North Carolina and Kansas. May–July.

90. Carex amphíbola Steud. Narrow-leaved Sedge. (Fig. 760.)

Carex amphibola Steud. Syn. Pl. Cyp. 234. 1855.
Carex grisea var. *angustifolia* Boott, Ill. 34. 1858.
Carex grisea var. (?) *rigida* Bailey, Mem. Torr. Club, 1: 56. 1889.

Glabrous, culms very slender, slightly scabrous above, erect, or spreading, 1°–2° long. Leaves 1″–2″ wide, mostly erect and somewhat rigid, the basal shorter than the culm; bracts similar to the upper leaves, erect, not over 1″ wide, overtopping the spikes; staminate spike solitary, short; pistillate spikes 2–4, erect, ½′–1′ long, less than 2″ thick, loosely several-flowered, the upper sessile, the lower on long filiform stalks; perigynia oblong or obovoid, firm, pointed but beakless, 3-angled, many-striate, more or less 2-ranked, 2″ long, about 1″ thick, longer than or the lower equalling the ovate scarious-margined awned spreading scales; stigmas 3.

In dry soil, New Jersey and Pennsylvania to Ohio and Missouri, south to Florida and Texas. April–June.

91. Carex flaccospérma Dewey. Thin-fruited Sedge. (Fig. 761.)

Carex laxiflora var. (?) *mutica* Torr. Ann. Lyc. N. Y. 3: 414. 1836. Not *C. mutica* R. Br. 1823.
Carex flaccosperma Dewey, Am. Journ. Sci. (II.) 2: 245. 1846.

Similar to *Carex grisea* and *C. glaucodea;* slightly glaucous, rather deep green, culms erect, 1°–2° tall. Leaves thin and flat, the basal ones 3″–6″ wide, shorter than or equalling the culm; the bracts leafy, much overtopping the spikes; staminate spike sessile or nearly so; pistillate spikes 2–4, oblong, erect, the lower slender-stalked; perigynia oblong, 3-angled, striate-nerved, sub-acute, 2½″ long; scales broadly ovate, green, not at all or very slightly scarious-margined, acute, cuspidate or the upper obtuse, 2–3 times shorter than the perigynia; stigmas 3.

Southern Missouri to Texas, east to North Carolina and Florida. June–July.

92. Carex glaucòdea Tuckerm. Glaucescent Sedge. (Fig. 762.)

Carex grisea var. *mutica* Carey in A. Gray, Man. 552. 1848. Not *C. mutica* R. Br. 1823.
Carex glaucodea Tuckerm.; Olney, Proc. Am. Acad. 7: 395. 1868.

Similar in habit to *Carex grisea*, but pale and very glaucous all over, culms smooth, erect or spreading, 6′–18′ long. Leaves 2″–4″ wide, the basal shorter than or equalling the culm; bracts foliaceous, overtopping the spikes; staminate spike sessile; pistillate spikes 3–5, erect, densely several-many flowered, the lower slender-stalked; perigynia oblong, many-striate, 1½″–2″ long, sub-acute, beakless, mostly nearly twice as long as the ovate scarious-margined acute cuspidate or short-awned scales; stigmas 3.

In open fields and meadows, Massachusetts to Pennsylvania, Illinois, Virginia and Arkansas. May–July.

93. Carex granulàris Muhl. Meadow Sedge. (Fig. 763.)

Carex granularis Muhl.; Willd. Sp. Pl. 4: 279. 1805.
C. granularis recta Dewey; Wood's Class-book, 763. 1860.

Glabrous, light green and slightly glaucous, culms slender, erect or spreading, smooth or nearly so, 6′–2½° long. Leaves flat, roughish or smooth, 1½″–3″ wide, the basal shorter than the culm; bracts similar to the culm-leaves and usually much exceeding the spikes; staminate spike solitary, sessile or short-stalked; pistillate spikes 3–5, distant or the upper two contiguous, erect or slightly spreading, narrowly oblong or cylindric, ½′–1¼′ long, 2″ thick, densely many-flowered, slender-stalked or the upper sessile perigynia ovoid, brown, somewhat swollen, strongly many-nerved, ascending, about 1″ long, tipped with a short, usually entire, bent or nearly straight beak; scales ovate, thin, acute or cuspidate, shorter than or sometimes equalling the perigynia; stigmas 3.

In moist meadows, New Brunswick to Ontario and Manitoba, south to Florida and Louisiana. May–July.

Carex granulàris Shriveri Britton.

Carex Halleana Olney, Car. Bor. Am. 6. 1871. Not *C. Halei*, Dewey, 1846.
Basal leaves broader, 2½″–8″ wide, glaucous; perigynia about one-half the size of the type, the more conspicuous point slightly bent. Pennsylvania to Wisconsin and Virginia.

94. Carex Cràwei Dewey. Crawe's Sedge. (Fig. 764.)

Carex Crawei Dewey, Am. Journ. Sci. (II.) 2: 246. 1846.
Carex heterostachya Torr. Am. Journ. Sci. (II.) 2: 248. 1846.

Glabrous, culms low, stiff, erect, 3′–15′ tall. Leaves rather stiff, flat, 1″–2″ wide, erect or nearly so, shorter than the culm, the bracts similar, rarely overtopping the spikes; staminate spikes 1–3, long-stalked; pistillate spikes 1–4, distant, cylindric, erect, ½′–1′ long, 2″–3″ thick, densely many-flowered, stalked or the upper sessile, the lowest often borne near the base of the culm; perigynia ovoid, ascending, nerved, usually minutely resinous dotted, 1″–1½″ long, tapering into a very short entire beak; scales obovate or oval, thin, acute or cuspidate, shorter than the perigynia; stigmas 3.

In moist meadows and on banks, Quebec to Manitoba, south to Pennsylvania and Tennessee. May–July.

95. Carex exténsa Gooden. Long-bracted Sedge. (Fig. 765.)

Carex extensa Gooden. Trans. Linn. Soc. 2: 175. 1794.

Glabrous, bright green, culms stiff, erect, 10′–2° tall. Leaves 1″–2″ wide, strongly involute, erect, shorter than the culm, the lower bract similar, much exceeding the spikes, the upper shorter, sometimes deflexed; staminate spike sessile, rarely pistillate at the base; pistillate spikes 1–3, erect, sessile and close together or the lowest short-stalked and distant, oblong, densely many-flowered, 5″–8″ long, about 3″ thick; perigynia ovoid or ovoid-oblong, brown, 1½″ long, narrowed at the base, slightly swollen, strongly many-ribbed, tapering into a short stout 2-toothed beak; scales ovate, acute, brown with a greenish midvein, shorter than the perigynia; stigmas 3.

Borders of salt meadows, Coney Island, N. Y., and near Norfolk, Va. Naturalized from Europe. June–Aug.

96. Carex flàva L. Yellow Sedge. (Fig. 766.)

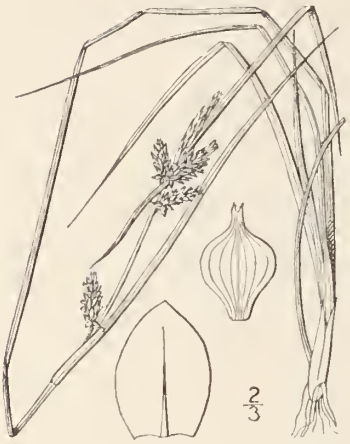
Carex flava L. Sp. Pl. 975. 1753.
Carex flava var. *graminis* Bailey, Mem. Torr. Club, 1: 30. 1889.

Glabrous yellow-green, culms very slender but stiff and erect, smooth or nearly so, 1°–2° tall. Leaves 1″–2½″ wide, flat, the radical shorter than or sometimes exceeding the culm, the lower bract elongated, spreading or ascending; staminate spike solitary, stalked or sessile; pistillate spikes 1–4, oblong or globose-oblong, erect, sessile and close together or the lower one distant and short-stalked, densely flowered, 3″–6″ long, about 3″ thick; perigynia narrowly ovoid, yellow, and spreading or deflexed when mature, 2″–3″ long, strongly several-nerved, the subulate 2-toothed beak about as long as the body; scales lanceolate or oval, acute or subacute, shorter and narrower than the perigynia; stigmas 3.

In swamps and wet meadows, Newfoundland to the Northwest Territory, south to Rhode Island, New Jersey, Pennsylvania, Ohio and Montana. Also in Europe. July–Sept.

Carex Oëderi Ehrh., found by the late I. C. Martindale at Atco, N. J. (according to Prof. Bailey), is a waif from Europe, otherwise not known from America.

97. Carex virídula Michx. Green Sedge. (Fig. 767.)



Carex viridula Michx. Fl. Bor. Am. 2: 170. 1803.
Carex flava var. *viridula* Bailey, Mem. Torr. Club, 1: 31. 1889.

Glabrous, bright green, culms slender, smooth, erect, 4′–15′ tall, often exceeded by the erect narrow basal leaves. Leaves 1″ or less wide, the bracts similar usually strictly erect and much overtopping the spikes; staminate spike sessile, sometimes pistillate at the top; pistillate spikes 2-5, all close together and sessile or the lower distant and short-stalked, oblong-cylindric or oblong, 2″–6″ long, 2″ or less in diameter; perigynia ovoid-oblong, 1″ or less long, strongly few-nerved, narrowed at the base, tapering into a 2-toothed beak about one-half as long as the body; scales ovate, shorter than the perigynia and about as wide; stigmas 3.

In bogs and on wet rocks, Newfoundland to Hudson Bay and the Northwest Territory, south to Maine, Pennsylvania, Minnesota, Utah and Washington. Summer.

Carex fùlva Gooden., a species of this group, was found many years ago at Tewksbury, Mass., evidently a waif from Europe, and is reported from Newfoundland.

Carex distans L., a related species, has been collected on ballast at Philadelphia.

98. Carex palléscens L. Pale Sedge. (Fig. 768.)

Carex pallescens L. Sp. Pl. 977. 1753.

Light green, culms slender, erect, rough above, 4′–20′ tall. Leaves flat, 1″–1½″ wide, pubescent at least on the sheaths, shorter than the culm; lower bract similar to the culm-leaves, erect or nearly so and exceeding the spikes; staminate spikes solitary, stalked; pistillate spikes 2–4, oblong, erect or somewhat speading, slender stalked or the upper one sessile, densely many-flowered, 4″–9″ long, 2″–2½″ in diameter usually clustered; perigynia short-oblong, pale, 1″ long, ½″ thick, obtuse, thin, faintly few-nerved, beakless, the orifice entire; scales ovate, membranous, cuspidate or short-awned, equalling or the upper shorter than the perigynia; stigmas 3.

In fields and meadows, Nova Scotia to western Ontario, south to Rhode Island, Pennsylvania, Illinois and Wisconsin. Ascends to 3500 ft. in Vermont. Also in Europe. May-July.

99. Carex abbreviàta Prescott. Torrey's Sedge. (Fig. 769.)

Carex Torreyi Tuckerm. Enum. Meth. 21. 1843. Not *C. Torreyana* Schwein. 1824.
Carex abbreviata Prescott; Boott, Trans. Linn. Soc. 20: 141. 1846.

Pale green, culms slender, rather stiff, erect, 10′–20′ tall, finely ciliate-pubescent. Leaves about 1″ wide, erect, elongated but shorter than the culm, finely and usually densely pubescent; lower bract ½′–2′ long, spreading or ascending, pubescent; staminate spike solitary, short-stalked; pistillate spikes 1–3, short oblong, dense, 3″–5″ long, about 3″ thick, sessile or the lower one short stalked, erect, clustered; perigynia broadly oblong or obovoid, glabrous, about 1″ long and more than ½″ thick, strongly many-nerved, obtuse, abruptly tipped by a short cylindric beak, scales cuspidate, shorter than the perigynia; stigmas 3.

In dry soil, New York to the Northwest Territory, south in the Rocky Mountains to Colorado. June–July.

100. Carex conoidea Schk. Field Sedge. (Fig. 770.)

Carex conoidea Schk. Riedgr. Nachtr. 67. *f. 168.* 1806.

Glabrous, culms slender, rather stiff, erect, 8′–18′ tall. Leaves 1″–1½″ wide, the basal sometimes equalling the culm; lower bracts similar to the culm-leaves, sometimes overtopping the spikes; staminate spike long-stalked; pistillate spikes 1–3, distant, erect, oblong or oblong-cylindric, 5″–12″ long, 2½″ thick, not densely flowered, the upper nearly sessile, the lower slender-stalked; perigynia oblong, obtusely 3-angled, narrowed to each end, acute, finely many-striate, beakless, 1″–1½″ long, about ½″ thick, the orifice entire; scales broadly ovate, scarious-margined, abruptly contracted into a rough awn, the lower longer than the perigynia, the upper shorter than or equalling them; stigmas 3.

In meadows, Nova Scotia to Ontario, south to Rhode Island, New Jersey, Ohio and Illinois. May–June.

101. Carex oligocàrpa Schk. Few-fruited Sedge. (Fig. 771.)

Carex oligocarpa Schk. Riedg. Nachtr. 58. *f. 170.* 1806.

Glabrous, culms very slender or almost filiform, spreading or reclining, roughish, 8′–18′ long. Leaves about 1″ wide, spreading, soft, the basal shorter than or equalling the culm, the bracts similar, usually exceeding the spikes; staminate spike solitary, long-stalked or nearly sessile; pistillate spikes 2–4, erect or nearly so, distant, loosely few-flowered, 4″–8″ long, less than 2″ thick, erect, the lower filiform-stalked, the upper sessile; perigynia oblong, firm, pale, finely many-striate, ascending, 1″–1¼″ long, abruptly narrowed into a short straight or oblique entire beak; scales ovate, tipped with a rough spreading awn, longer than or equalling the perigynia; stigmas 3.

In dry woods and thickets, Vermont and Ontario to Michigan, south to New Jersey, West Virginia, Kentucky and Missouri. May–July.

102. Carex Hitchcockiàna Dewey. Hitchcock's Sedge. (Fig. 772.)

Carex Hitchcockiana Dewey, Am. Journ. Sci. 10: 274. 1826.

Culms slender, erect, somewhat rough, 1°–2° tall. Leaves 1½″–3″ wide, the basal mostly shorter than the culm, the upper and similar bracts much overtopping the spikes, their sheaths pubescent, their blades somewhat so; staminate spike stalked or nearly sessile; pistillate spikes 2–4, loosely few-flowered, erect, rather distant, stalked or the upper sessile; perigynia ovoid, obtusely 3-angled, finely many-striate, ascending, 1½″ long, nearly 1″ thick, tipped with a short stout oblique entire beak; scales ovate or ovate-lanceolate, scarious-margined, rough-awned, longer than or equalling the perigynia; stigmas 3.

In woods and thickets, Vermont and Ontario to Michigan, south to New Jersey, West Virginia, Kentucky and Missouri. May–July.

103. Carex altocaùlis (Dewey) Britton. Sheathed Sedge. (Fig. 773.)

Carex vaginata var. *altocaulis* Dewey, Am. Journ. Sci. (II) 41: 227. 1866.
Carex Saltuensis Bailey, Mem. Torr. Club, 1: 7. 1889.

Glabrous, light green but not glaucous, culms very slender, weak, spreading or reclining, 1°–2° long. Leaves 1½″–2″ wide, shorter than the culm, the upper ones and the bracts usually very short; staminate spike long-stalked; pistillate spikes 2 or 3, distant, slender-stalked, ascending, spreading or recurved, less than 1′ long, loosely several-flowered, their stalks partly enclosed by the long sheaths; perigynia oblong, 3-angled, narrowed at the base, faintly few-nerved 2″ long, nearly 1″ thick, tipped with a beak about one-fourth the length of the body, the orifice 2-toothed, oblique; scales oval or ovate-lanceolate, acute or the upper obtuse, shorter than or the lower equalling the perigynia; stigmas 3.

In swamps, Quebec and Vermont to Ontario, New York and Minnesota. Summer.

104. Carex polymórpha Muhl. Variable Sedge. (Fig. 774.)

Carex polymorpha Muhl. Gram. 239. 1817.

Glabrous, rather dark green, culms stiff, strictly erect, smooth or nearly so, 1°–2° tall. Leaves flat, 1½″–2″ wide, nearly erect, the basal sometimes as long as the culm, the others much shorter; bracts usually little longer than the pistillate spike; staminate spikes 1 or 2, long-stalked; pistillate spikes commonly solitary, sometimes 2, erect, short-stalked or sessile, densely many-flowered or sometimes looser at the base, 1′–1½′ long and 4″ thick, occasionally staminate at the summit; perigynia ovoid-oblong, obscurely 3-angled, fully 2″ long and 1″ in diameter, the beak more than one-half as long as the body, the orifice oblique; scales red-brown, obtuse or the lower acute, somewhat shorter than the perigynia; stigmas 3.

In swamps or wet meadows, Massachusetts to northern New Jersey, south to North Carolina. Local. Ascends to 2000 ft. in Pennsylvania. June–Aug.

105. Carex tetánica Schk. Wood's Sedge. (Fig. 775.)

Carex tetanica Schk. Riedgr. Nachtr. 68. *figs. 100, 207.* 1806.
Carex tetanica var. *Woodii* Bailey, Mem. Torr. Club, 1: 53. 1889.

Light green and glabrous, culms slender, erect or nearly so, rough above, 1°–2° tall. Leaves flat, 1″–2″ wide, the basal about equalling the culm; bracts narrow, elongated, sometimes overtopping the spikes; staminate spike stalked, the stalk sometimes 3′ long; pistillate spikes 2 or 3, erect, distant, narrowed at the base, loosely or compactly several-many-flowered, 1′ long or less, or the lower filiform-stalked and drooping; perigynia oblong, green, prominently many-nerved, about 1½″ long, less than 1″ thick, oblique, the summit curved outwardly and tapering to an entire orifice, beakless; scales ovate-oblong, obtuse or the lower mucronate, shorter than the perigynia or the lower equalling them; stigmas 3.

In meadows and wet woods, Ontario to Manitoba, North Carolina and Louisiana. June–July.

106. Carex Mèadii Dewey. Mead's Sedge. (Fig. 776.)

Carex Meadii Dewey, Am. Journ. Sci. **43**: 90. 1842.
Carex tetanica var. *Meadii* Bailey, Proc. Am. Acad. **22**: 118. 1886.
Carex tetanica var. *Carteri* Porter, Proc. Acad. Phila. **1887**: 76. 1887.
Carex tetanica var. *Canbyi* Porter, Proc. Acad. Phila. **1887**: 76. 1887.

Similar to the preceding species, culm stouter, very rough above, 12′–18′ tall. Basal leaves usually shorter than the culm; bracts short, not overtopping the spikes; staminate spike long-stalked; pistillate spikes 1–3, sometimes staminate at the summit, occasionally compound at the base, oblong-cylindric, densely flowered, ½′–1′ long, about 3″ in diameter, erect, stalked or the upper one sessile; perigynia broadly oblong, prominently many-nerved, green, 1½″ long, about 1″ in diameter, tipped with a minute slightly bent beak; scales ovate, green with purple-brown margins, acute, mucronate or the upper obtuse, the upper short, the lower sometimes exceeding the perigynia; stigmas 3.

In swamps and wet meadows, Rhode Island to Pennsylvania and Georgia, west to Michigan, Assiniboia, Nebraska and Arkansas. The lowest spike is sometimes borne on a very long stalk arising from the axil of one of the basal leaves. May–July.

107. Carex laxiflòra Lam. Loose-flowered Sedge. (Fig. 777.)

Carex laxiflora Lam. Encycl. **3**: 392. 1789.

Glabrous, rather pale green, culms erect or reclining, slender, roughish above, 6′–2° long. Leaves 1½″–3″ wide, soft, the basal mostly shorter than the culm, the bracts similar to the culm-leaves sometimes overtopping the spikes; staminate spike usually stalked; pistillate spikes 2–4, distant, linear-cylindric, loosely several–many-flowered, ½′–1′ long, 1½″–2″ thick, all slender-stalked and spreading or drooping or the upper one erect and sessile; perigynia ascending, obovoid, more or less oblique, 1¼″–1½″ long, rather more than ½″ thick, narrowed at the base, strongly many-nerved, tapering into a short stout outwardly bent entire beak; scales ovate with broad white scarious margins, acute, cuspidate or awned, shorter than or exceeding the perigynia; stigmas 3.

In meadows and thickets, Maine and Ontario to Minnesota, south to Florida, Alabama and the Indian Territory. Ascends to 5000 ft. in Virginia. May–July.

Carex laxiflòra blánda (Dewey) Boott, Ill. 37. 1858.

Carex blanda Dewey, Am. Journ. Sci. **10**: 45. 1826.
Carex laxiflora var. *striatula* Carey in A. Gray, Man. Ed. 2, 524. 1856.

Pistillate spikes cylindric, mostly densely flowered, the upper sessile or nearly so, erect, contiguous to the usually sessile staminate one, the lower slender-stalked. Range of the type. Perhaps distinct.

Carex laxiflòra vàrians Bailey, Mem. Torr. Club, **1**: 32. 1889.

Stouter and taller than the preceding; leaves 2½″–3½″ wide; pistillate spikes sometimes 1½′ long and 2½″ thick, dense, often compound at the base, the upper sessile or short-stalked and contiguous to the sessile staminate one, the lower long-stalked. New Hampshire to southern New York and Missouri. Range undetermined.

Carex laxiflòra patulifòlia (Dewey) Carey in A. Gray, Man. Ed. 2, 524. 1856.

Carex anceps var. *patulifolia* Dewey, Wood's Bot. 423. 1845.

Glaucous or pale green; basal leaves 2½″–4½″ wide; staminate spike usually stalked; pistillate spike 1′ long or more, loosely flowered, scattered; perigynia oblong or ellipsoid, the beak nearly straight. Halifax, Nova Scotia (according to Macoun), Massachusetts to Michigan, south to Virginia and Tennessee.

Carex laxiflòra divaricàta Bailey, Mem. Torr. Club, **1**: 33. 1889.

Perigynia larger than in the other forms, contracted into a stipe one half as long as the body. Washington, D. C.

108. Carex stylofléxa Buckley. Bent Sedge. (Fig. 778.)

Carex styloflexa Buckley, Am. Journ. Sci. 45: 174. 1843.
Carex laxiflora var. *styloflexa* Boott, Ill. 37. 1858.

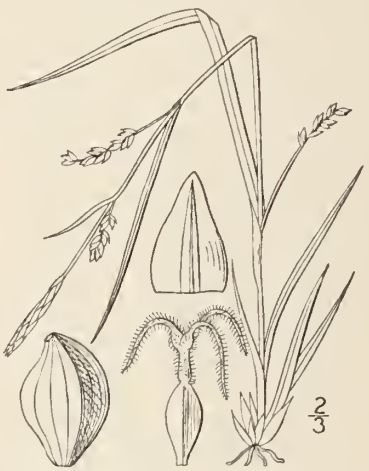
Glabrous, culms leaning, slender, smooth, 1°–2° tall. Leaves 1½″–3″ wide, flat, shorter than the culm; bracts short, rarely exceeding the spikes; staminate spike solitary, usually long-stalked but sometimes nearly sessile; pistillate spikes 1–4, distant, loosely few–several-flowered, less than 8″ long, the lower drooping on filiform stalks; perigynia oblong, triangular, many-nerved, about 2″ long, 1″ thick, somewhat oblique, tapering gradually to both ends and thus slender-beaked; scales ovate or ovate-lanceolate, scarious-margined, acute, cuspidate or short-awned, shorter than the perigynia; stigmas 3.

In woods and thickets, southern New York and Pennsylvania to Florida, Louisiana and Texas. May–July.

109. Carex digitàlis Willd. Slender Wood Sedge. (Fig. 779.)

Carex digitalis Willd. Sp. Pl. 4: 298. 1805.

Glabrous, bright green, not at all glaucous, culms slender or almost filiform, nearly or quite smooth, usually reclining, 4′–18′ long. Leaves flat, 1″–2″ wide, the basal sometimes exceeding the culm, the upper ones and the bracts similar but shorter, the latter commonly overtopping the spikes; staminate spike stalked; pistillate spikes 2–4, linear, loosely alternately flowered, ½′–1′ long, the upper one sessile or nearly so, the others filiform-stalked and widely spreading or drooping; perigynia oblong, sharply triangular, many-nerved, brown when ripe, narrowed at both ends, 1″ long, more than ½″ thick, the very short beak slightly oblique; scales lanceolate or ovate-lanceolate, scarious-margined, acute, acuminate or short-awned, shorter than or the lower about equalling the perigynia; stigmas 3.



In woods and thickets, Maine and southern Ontario to Minnesota, south to Florida and Texas. Ascends to 3000 ft. in Virginia. May–July.

Carex digitàlis copulàta Bailey, Mem. Torr. Club, 1: 47. 1889.

Larger in every way, culms sometimes 2° long, reclining; leaves 2½″–4″ wide; pistillate spikes shorter and denser; perigynia larger. Michigan and southern Ontario.

110. Carex Careyàna Torr. Carey's Sedge. (Fig. 780.)

Carex Careyana Torr.; Dewey, Am. Journ. Sci. 30: 60. *f. 88.* 1836.

Glabrous, bright green, culms slender, erect or somewhat reclining, smooth or nearly so, 1°–2° tall. Basal leaves flat, 3″–6″ wide, much shorter than the culm; bracts linear-lanceolate with very long sheaths, the blades 1′–3′ long; staminate spike usually large, long-stalked; pistillate spikes 1–3 (commonly 2), erect, loosely few–several-flowered, less than 1′ long, the upper sessile or short-stalked, the lower on a long filiform stalk; perigynia ovoid-oblong, very sharply 3-angled, many-nerved, fully 2″ long and over 1″ thick, brown, the short beak slightly oblique, entire; scales ovate with white hyaline margins, cuspidate or awned, shorter than the perigynia; stigmas 3.

In woods, New England (according to Bailey); New York to Michigan and Virginia. May–June.

111. Carex Albursìna Sheldon. White Bear Sedge. (Fig. 781.)

Carex laxiflora var. *latifolia* Boott, Ill. 38. 1858. Not *C. latifolia* Moench.
Carex Albursina Sheldon, Bull. Torr. Club, 20: 284. 1893.

Glabrous, rather deep green, culms stout, nearly smooth, flattened, usually spreading, 8′–2° long. Basal leaves lanceolate or oblong-lanceolate, acuminate, shorter than the culm, ½′–1½′ wide; bracts similar to the narrower culm-leaves, the upper overtopping the spikes; staminate spikes sessile or nearly so; pistillate spikes 2–4, distant and narrowly linear, stalked or the upper sessile and close together, ½′–1¼′ long, very loosely flowered; perigynia obovoid, obtusely 3-angled, strongly many-nerved, 2″ long, 1″ thick, tipped with a very short beut entire beak; scales ovate-oblong, scarious-margined, obtuse or the lower acute, shorter than the perigynia; stigmas 3.

In woods, Massachusetts to New York, Ohio and Minnesota, south to Virginia and Michigan. Ascends to 2300 ft. in Virginia. June–Aug. The specific name is in allusion to White Bear Lake, Minn.

112. Carex plantagínea Lam. Plantain-leaved Sedge. (Fig. 782.)

Carex plantaginea Lam. Encycl. 3: 392. 1789.

Glabrous, rather dark green, culms slender, erect or reclining, 6′–2° long. Leaves ½′–1′ wide, shorter than or equalling the culm, persistent through the winter and until the new culms develop in the following spring; bracts short, usually with purple or purplish clasping sheaths; staminate spike long-stalked, purple; pistillate spikes 3 or 4, erect, all slender-stalked, 1′ or less long, loosely flowered, the stalks of the upper ones enclosed in the sheaths; perigynia oblong, outwardly curved, many-nerved, 1½″ long, about 1″ thick, longer than or equalling the ovate cuspidate scales; stigmas 3.

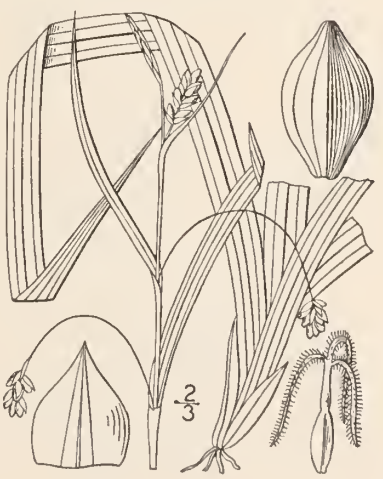
In woods, New Brunswick and Ontario to Manitoba, south to Virginia and Wisconsin. Ascends to 2100 ft. in Virginia. May–July.

113. Carex laxicúlmis Schwein. Spreading Sedge. (Fig. 783.)

Carex laxiculmis Schwein. Ann. Lyc. N. Y. 1: 70. 1824.
Carex retrocurva Dewey, Wood's Bot. 423. 1845.

Glabrous, blue-green and glaucous, culms filiform, smooth or very nearly so, ascending or diffuse, 6′–2° long. Basal leaves elongated, 3″–5″ wide, often longer than the culms; bracts similar to the narrower culm-leaves, usually short; staminate spike long-stalked; pistillate spikes 2–4, oblong, loosely few-flowered, 3″–6″ long, about 2″ thick, drooping on long hair-like stalks or the upper short-stalked and erect; perigynia ovoid-oblong, sharply 3-angled, many-nerved, about 1″ long and rather more than ½″ thick, narrowed at both ends, scarcely beaked, longer than the ovate green cuspidate or short-awned scales; stigmas 3.

In woods and thickets, southern Ontario to Michigan, south to Rhode Island and Virginia. Ascends to 5600 ft. in Virginia. May–June.



114. Carex ptychocàrpa Steud. Thicket Sedge. (Fig. 784.)

Carex ptychocarpa Steud. Syn. Pl. Cyp. 234. 1855.

Glabrous, pale green and glaucous, culms erect, very slender, smooth, only 2′–6′ tall. Leaves flat, the basal 2″–4″ wide, much longer than the culm; bracts foliaceous, usually overtopping the spikes; staminate spike small, sessile; pistillate spikes 2 or 3, sessile and close together at the summit or the lower one slender-stalked and nearly basal, all erect, loosely few-flowered, 4″–8″ long; perigynia oblong, pale, 3-angled, rather strongly many-nerved, 1″ long, rather more than ½″ thick, pointed at both ends, minutely straight-beaked, the orifice entire; scales ovate, thin, obtuse, about one-half as long as the perigynia; stigmas 3.

In moist woods and thickets, Massachusetts and New Jersey to Florida and Louisiana. June–Sept.

115. Carex platyphýlla Carey. Broad-leaved Sedge. (Fig. 785.)

Carex plantaginea Michx. Fl. Bor. Am. 2: 173. 1803. Not Lam. 1789.
Carex platyphylla Carey, Am. Journ. Sci. (II.) 4: 23. 1847.

Glabrous, pale green and glaucous, culms slender, spreading or reclining, 4′–15′ long. Leaves flat and broad, ½′–1′ wide, shorter than the culm; bracts linear-lanceolate with long clasping sheaths, 1″–2½″ wide, not overtopping the spikes, usually less than 2′ long; staminate spike stalked; pistillate spikes 2–4, distant, erect, all slender-stalked or the upper one nearly sessile, loosely several-flowered, 5″–10″ long, their stalks commonly enclosed in the sheaths, perigynia oblong, 3-angled, many-nerved, slightly bent at the narrowed summit, 1″–1½″ long, rather more than ½″ thick, equalling or somewhat longer than the ovate-oblong acute cuspidate or short-awned scales; stigmas 3.

In woods and thickets, Quebec and Ontario to Michigan, south to Virginia and Illinois. Ascends to 2500 ft. in Virginia. May–June.

116. Carex panícea L. Grass-like Sedge. Carnation-grass. (Fig. 786.)

Carex panicea L. Sp. Pl. 977. 1753.

Glabrous, pale bluish green and glaucous, culms slender, smooth, erect, stiff, 1°–2° tall. Leaves flat, 1″–2″ wide, the basal ones shorter than or equalling the culm, those of the culm and the bracts much shorter and narrower; staminate spikes 1 or 2, stalked; pistillate spikes 2 or 3, distant, filiform-stalked or the upper nearly sessile, erect, 1′ or less long, about 2½″ thick, rather loosely several–many-flowered, the upper sometimes staminate at the summit; perigynia oval, about 1½″ long and nearly 1″ in diameter, slightly swollen and obscurely 3-angled, yellow, purple or mottled, faintly few-nerved, tipped with a very short entire somewhat oblique beak; scales ovate, acute, purple or purple-margined, shorter than the perigynia; stigmas 3.

In fields and meadows, Nova Scotia to Maine and Rhode Island. Naturalized from Europe. June–July.

117. Carex lívida (Wahl.) Willd. Livid Sedge. (Fig. 787.)

Carex limosa var. *livida* Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 162. 1803.
Carex livida Willd. Sp. Pl. 4: 285. 1805.

Glabrous, pale green and very glaucous, culms slender, strictly erect, smooth, 1°–1½° tall. Leaves 1″–2″ wide, the basal shorter than or sometimes about equalling the culm, involute in drying; bracts narrow, usually short; staminate spike solitary, short-stalked; pistillate spikes 1–3, 5″–12″ long, about 2″ thick, erect and clustered at the summit of the culm, narrowly cylindric, densely several-flowered or looser at the base, the third, when present, distant or sometimes nearly basal, stalked; perigynia oblong, very pale, nearly 2″ long, less than 1″ thick, finely nerved, straight, beakless, narrowed to an entire orifice; scales ovate, obtuse or the lower subacute, rather shorter than the perigynia; stigmas 3.

In bogs, Labrador and Hudson Bay to Alaska, south to Connecticut, the pine barrens of New Jersey, central New York and Michigan. Also in Europe. Summer.

118. Carex aùrea Nutt. Golden-fruited Sedge. (Fig. 788.)

Carex aurea Nutt. Gen. 2: 205. 1818.

Glabrous, light green, culms very slender, erect or reclining, 2′–15′ long. Leaves flat, 1″–1½″ wide, the basal equalling or exceeding the culm; bracts similar to the culm-leaves, commonly much overtopping the spikes; terminal spike short-stalked, staminate or androgynous; pistillate spikes 2–4, oblong or linear-oblong, erect and clustered near the summit or the lower one distant, filiform-stalked, loosely or compactly few-flowered, 2″–10″ long, about 1½″ thick; perigynia obovoid or subglobose, white or nearly white when young, becoming fleshy, yellow or brown and about 1″ in diameter when mature, many-nerved, beakless, the orifice entire; scales ovate, membranous acute, blunt, cuspidate or short-awned, shorter than or the lower exceeding the perigynia; stigmas mostly 2.

In wet meadows, springs and on wet rocks, Newfoundland to the Northwest Territory and British Columbia, south to Massachusetts, Pennsylvania, Michigan, Utah and Washington. Summer.

119. Carex bicolor All. Parti-colored Sedge. (Fig. 789.)

Carex bicolor All. Fl. Ped. 2: 267. 1785.

Similar to the preceding species, but somewhat glaucous; culms slender, erect, 2′–18′ tall. Basal leaves 1″–2″ wide, shorter than or equalling the culm; spikes 2–4, mostly clustered at the summit of the culm, dense, the terminal one partially staminate; perigynia oblong, white, compressed, few-nerved, less than 1″ long, not fleshy at maturity, abruptly tipped with a very short entire nearly cylindric beak; scales brown-purple with white midvein and margins, oval, obtuse or acute, shorter than the perigynia.

Greenland and Labrador (according to Boott). Also in Europe. Summer.

120. Carex setifòlia (Dewey) Britton. Bristle-leaved Sedge. (Fig. 790.)

Carex alba var. *setifolia* Dewey, Am. Journ. Sci. 11: 316. 1826.

Carex eburnea Boott.; Hook. Fl. Bor. Am. 2: 226. *pl. 225.* 1840.

Glabrous, pale green, culms filiform, smooth, weak, 4′–15′ long. Leaves filiform, shorter than the culm, less than ¼″ wide; bracts reduced to bladeless, sheaths 2″–5″ long; staminate spikes solitary, sessile or very nearly so, 3″–4″ long; pistillate spikes 2–4, erect, slender-stalked, 2″–4″ long, rather less than 1″ thick, loosely few-flowered, the upper commonly overtopping the staminate, the lower one sometimes distant; perigynia oblong, pointed at both ends, 3-angled, 1″ long, ½″ or less thick, polished and nearly black when mature, very faintly few-nerved, tapering into a short entire beak; scales ovate, obtuse or the lower acute, thin, hyaline, shorter than the perigynia; stigmas 3.

In dry sandy or rocky soil, preferring limestone rocks, New Brunswick to the Northwest Territory, south to Pennsylvania, Kentucky and Nebraska. May–July.

121. Carex concínna R. Br. Low Northern Sedge. (Fig. 791.)

Carex concinna R. Br. Frank. Journ. 763. 1823.

Culms filiform, smooth, 2′–6′ tall. Leaves about 1″ wide, flat, pale green, much shorter than the culm; bracts reduced to green bladeless sheaths or the lower one with an erect subulate blade 3″–6″ long; staminate spike solitary, sessile; pistillate spikes 1–3, sessile and clustered or the lower one somewhat distant and short-stalked, erect, 2″–4″ long, about 1″ thick, compactly few-flowered; perigynia oblong-ovoid, 3-angled, pubescent, short-beaked, few-nerved, about twice as long as the ovate obtuse or subacute green or purplish scales; stigmas 3.

In rocky places, Quebec and Ontario to British Columbia. Summer.

122. Carex Richardsòni R. Br. Richardson's Sedge. (Fig. 792.)

Carex Richardsoni R. Br. Frankl. Journ. 751. 1823.

Culms slender, rough, erect, 4′–12′ tall. Leaves flat, about 1″ wide, the basal shorter than or sometimes equalling the culms, those of the culm very short; bracts bladeless, sheathing, ¼′–1′ long, usually brown-purple with a white hyaline acute summit; staminate spike solitary, short-stalked; pistillate spikes 1 or 2, erect, narrowly cylindric, short-stalked, 4″–9″ long, compactly several-flowered, close together, their stalks partly or wholly enclosed in the sheaths; perigynia obovoid, pubescent, about 1″ long, minutely beaked; scales mostly longer than the perigynia, ovate, obtuse or subacute, purple, conspicuously white-margined; stigmas 3.

In dry soil, Ontario to the Northwest Territory and British Columbia, south to western New York, Illinois Michigan and South Dakota. Summer.

123. Carex pedunculàta Muhl. Long-stalked Sedge. (Fig. 793.)

Carex pedunculata Muhl.; Willd. Sp. Pl. 4: 222. 1805.

Densely matted, rather bright green, culms very slender, roughish above, diffuse or reclining, 3′–10′ long. Leaves flat, 1″–1½″ wide, the basal commonly longer than the culms; sheaths green, the upper almost bladeless, the lower with short leaf-like blades; staminate spike long-stalked, usually with some pistillate flowers at its base; pistillate spikes 2–6, 3″–6″ long, few-flowered, filiform-stalked and spreading or drooping, scattered, commonly borne at every node, some of them appearing basal; perigynia obovoid, sharply 3-angled, puberulent or becoming glabrous, 2″ long, pale green, nerveless, narrowed below into a stipe, tipped with a minute and somewhat oblique entire beak; scales green or purplish, ovate, abruptly cuspidate or the lower subulate-awned, equalling or the lower considerably exceeding the perigynia; stigmas 3.

In dry woods, Anticosti to Manitoba, south to Virginia, Pennsylvania and Minnesota. May–July.

124. Carex pedicellàta (Dewey) Britton. Fibrous-rooted Sedge. (Fig. 794.)

Carex varia Dewey, Am. Journ. Sci. 11: 102. 1826. Not Muhl. 1805.
C. varia var. *pedicellata* Dewey, Am. Journ. Sci. 11: 162. 1826.
Carex communis Bailey, Mem. Torr. Club, 1: 41. 1889.
Carex pedicellata Britton, Mem. Torr. Club, 5: 87. 1894.

Light green, not stoloniferous, fibrous-rooted, culms slender, roughish above, erect or reclining, 6′–20′ long. Leaves 1″–2″ wide, shorter than the culms; lower bract narrowly linear or subulate, ¼′–2′ long; staminate spike short-stalked, 4″–12″ long; pistillate spikes 2–4, short-oblong, few-flowered, sessile and usually separated, or the lowest short-stalked; perigynia oval or oblong, rather less than 1″ long and a little more than ½″ in diameter, pale, pubescent, slightly 1-ribbed on each side, tipped with a subulate 2-toothed beak one-fourth the length of the body; scales green, ovate, acute, about equalling the perigynia; stigmas 3.

In dry soil, Nova Scotia to Minnesota, Georgia, Ohio and Michigan. Ascends to 5700 ft. in Virginia. May–July.

Carex pedicellàta Wheèleri (Bailey) Britton, Mem. Torr. Club, 5: 88. 1894.

Carex communis var. *Wheeleri* Bailey, Mem. Torr. Club, 1: 41. 1889.

Usually lower than the species and the leaves much shorter than the culm; staminate spike only 2″–3″ long; pistillate spikes closer together. Nova Scotia to Connecticut and Michigan.

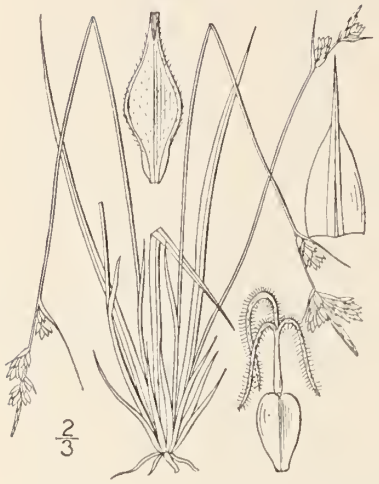
125. Carex Pennsylvánica Lam. Pennsylvania Sedge. (Fig. 795.)

Carex Pennsylvanica Lam. Encycl. 3: 388. 1789.

Dark or dull green, stoloniferous, culms slender, erect, smooth or roughish, 6′–15′ tall. Leaves ½″–1½″ wide, the basal shorter than or sometimes exceeding the culm, the old sheaths persistent and fibrillose; lower bract subulate or scale-like, rarely over ½′ long; staminate spike sessile or very short-stalked, ½′–1′ long; pistillate spikes 1–3, short-oblong, few-flowered, sessile, contiguous or the lower somewhat distant; perigynia broadly oval, about 1″ long and more than ½″ in diameter, pubescent, 1-ribbed on each side, narrowed at the base, tipped with a 2-toothed beak about one-fourth the length of the body; scales ovate, purplish, acute or cuspidate, equalling or a little longer than the perigynia; stigmas 3.

In dry soil, New Brunswick to Manitoba and the Northwest Territory, south to North Carolina, Tennessee and Kansas. Ascends to 5000 ft. in North Carolina. May–June.

126. Carex vària Muhl. Emmons' Sedge. (Fig. 796.)



Carex varia Muhl.; Wahl. Kongl. Vet. Acad. Handl. (Il.) 24: 159. 1803.
C. Emmonsii Dewey; Torr. Ann. Lyc. N. Y. 3: 411. 1836.
C. varia var. *colorata* Bailey, Mem. Torr. Club, 1: 41. 1889.

Rather bright green, stoloniferous, culms filiform, erect or somewhat spreading, roughish above, 6′–18′ long. Leaves elongated, ½″–1¼″ wide, nearly always shorter than the culms; lower bract scale-like or subulate, rarely 1′ long; staminate spike 2″–4″ long, sessile, sometimes scarcely overtopping the upper pistillate one, but usually rather prominent; pistillate spikes 2–4, mostly close together, 2″–3″ long, few-flowered; perigynia oblong, pubescent, about 1″ long ½″ thick, narrowed at the base, tipped with a subulate minutely 2-toothed beak commonly one-half the length of the body; scales ovate, green or purplish-brown, acute, about as long as the perigynia; stigmas 3.

In dry soil, Nova Scotia to western Ontario and Manitoba, south to Georgia and Texas. May–July.

127. Carex Nòvae-Ángliae Schwein. New England Sedge. (Fig. 797.)

C. Novae-Angliae Schwein. Ann. Lyc. N. Y. 1: 67. 1824.

Rather dark green, stoloniferous, culms filiform, erect or reclining, 4′–8′ long. Leaves about ½″ wide, soft, elongated, often exceeding the culms; staminate spike short-stalked, very narrow or almost filiform, 3″–8″ long; pistillate spikes 1–4, distant, subglobose, few-flowered, sessile or the lower short-stalked; lower bract filiform, short or sometimes overtopping the spikes; perigynia narrowly obovoid or oblong, 1″ long, ½″ thick, pubescent, tipped by a subulate 2-toothed beak about one-fourth the length of the body; scales ovate, greenish-brown, acute or cuspidate; stigmas 2 or 3.

In wet shaded places, New Brunswick to Maine, Massachusetts and northern New York. Summer.

128. Carex defléxa Hornem. Northern Sedge. (Fig. 798.)

Carex deflexa Hornem. Plantel. Ed. 3, 1: 938. 1821.
Carex deflexa var. *Deanei* Bailey, Mem. Torr. Club. 1: 42. 1889.
Carex Peckii Howe; Peck, Ann. Rep. N. Y. State Mus. Nat. Hist. 47: 166. 1894.

Aspect of smaller forms of the preceding species; culms filiform, erect or spreading, 1′–12′ long, shorter than or exceeding the narrow bright green leaves. Bracts subulate or very narrowly linear, ½′–2′ long; staminate spike sessile, 1″–3″ long, sometimes oblique, inconspicuous; pistillate spikes 1–4, 2″–4″ long, oblong, few-flowered, the upper sessile, the lower slender-stalked and somewhat separated, commonly also 1 or 2 nearly basal filiform-stalked spikes from the lowest sheaths; perigynia oblong, much narrowed at the base, pubescent, 1″ or less long, tipped with a flat 2-toothed beak about one-fourth the length of the body; scales ovate or ovate-lanceolate, green, acute or cuspidate; stigmas 3 or 2.

In open places, Nova Scotia to Ontario, Maine, Vermont and Pennsylvania, mostly at high altitudes. Summer. *Carex Peckii* Howe (*C. albicans* Willd., an older name) may be distinct.

Carex defléxa Farwéllii Britton.

Carex deflexa var. *media* Bailey, Mem. Torr. Club, 1: 43. 1889. Not *C. media* R. Br. 1823.

Densely tufted; culms stiff, erect, 6′–15′ tall, commonly much longer than the leaves; stam-

inate spike conspicuous, 3″–5″ long, sessile or short-stalked; pistillate spikes 2 or 3, scattered, the lower slender-stalked and subtended by a foliaceous bract which often overtops the culm; perigynia 1″–1½″ long. Northern Michigan to British Columbia and Oregon, south in the Rocky Mountains to Colorado. Perhaps a distinct species.

129. Carex praècox Jacq. Vernal Sedge. (Fig. 799.)

Carex praecox Jacq. Fl. Austr. 5: 23. *pl. 446.* 1778.

Dark green, stoloniferous, culms very slender, erect or reclining, smooth, 3′–12′ long. Leaves ½″–1½″ wide, almost always much shorter than the culm; lower bract subulate, ¼′–1′ long; staminate spike sessile or very short-stalked, usually large and conspicuous; pistillate spikes 1–3, all close together at the summit, oblong, several-flowered, 3″–6″ long, about 2½″ in diameter, sessile or the lower short-stalked, sometimes pistillate at the summit; perigynia oblong or obovoid, sharply 3-angled, pubescent, brown, about 1″ long; tipped with a very minute beak; scales ovate, purple-brown with a lighter midvein, acute, cuspidate or the lower rough-awned, about equalling the perigynia; stigmas 3.

Eastern Massachusetts to New York. Naturalized from Europe. Native also of Asia. May–June.

130. Carex nìgro-marginàta Schwein. Black-edged Sedge. (Fig. 800.)

C. nigro-marginata Schwein. Ann. Lyc. N. Y. 1: 68. 1824.

Bright green, strongly stoloniferous, culms filiform, erect or spreading, 2′–8′ long. Leaves 1″–2″ wide, very much longer than the culms, rather stiff, often 12′ or more long; bracts very short and subulate or wanting; staminate spike sessile, inconspicuous, 2″–3″ long, purple; pistillate spikes 1–3, few-flowered, sessile at the base of the staminate, about 3″ long; perigynia oblong, narrowed at the base into a short stipe, pubescent or nearly glabrous, 1″–1½″ long, about ½″ thick, 1-ribbed on each side, tipped with a cylindric-subulate 2-toothed beak one-third to one-half as long the body; scales ovate, acute or cuspidate, green with purple margins or variegated, rather longer than the perigynia; stigmas 3.

Dry soil, New York to North Carolina. May–July.

131. Carex umbellàta Schk. Umbel-like Sedge. (Fig. 801.)

Carex umbellata Schk. Riedgr. Nachtr. 75. *f. 171.* 1806.
Carex umbellata var. *vicina* Dewey, Am. Journ. Sci. 11: 317. *pl. D. f. 13.* 1826.

Rather light green, closely tufted and matted, stoloniferous, culms filiform, very nearly smooth, 1′–6′ long, erect or reclining. Leaves ½″–1½″ wide, usually much exceeding the culm, sometimes 1° long, the old sheaths fibrillose; staminate spike solitary, terminal, ½′ or less long, commonly conspicuous; pistillate spikes 1–3, all filiform-stalked from the basal sheaths or 1 or 2 of them sessile or very nearly so at the base of the staminate, ovoid-oblong, several-flowered, 2″–4″ long; perigynia oval, finely pubescent, pale, obtusely 3-angled, the body rather less than 1″ long, tipped with a subulate 2-toothed beak of nearly its length; scales ovate-lanceolate, acuminate or short-awned, about as long as the perigynia; stigmas 3.

Dry soil, Nova Scotia to the Northwest Territory, New Jersey, the Indian Territory and Oregon. May–July.

132. Carex pubéscens Muhl. Pubescent Sedge. (Fig. 802.)

Carex pubescens Muhl.; Willd. Sp. Pl. 4: 281. 1805.

Pubescent all over, bright green, stoloniferous, culms slender, usually reclining, 1°–2° long. Leaves flat, soft, elongated, shorter or longer than culm, 2″–3½″ wide; lower bracts 1′–3′ long, occasionally overtopping the spikes; staminate spike sessile or nearly so, sometimes with pistillate flowers at its base; pistillate spikes 2–4, oblong-cylindric, rather loosely several–many-flowered, erect, 4″–10″ long, 2″–2½″ thick, the upper sessile, the lower somewhat separated and short-stalked; perigynia sharply 3-angled, obovoid, narrowed to a stipe-like base, densely pubescent, and, including the subulate straight minutely 2-toothed beak, about 2″ long; scales ovate, scarious-margined, rough-awned or cuspidate, about as long as the perigynia; stigmas 3.

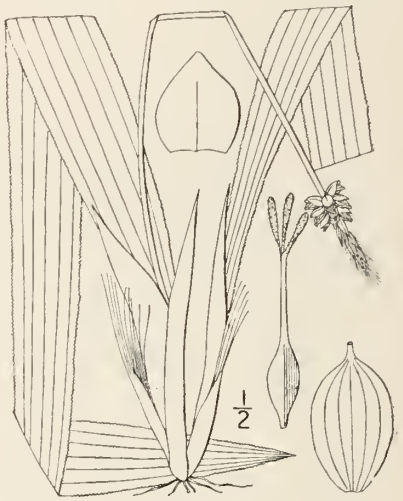
In woods and thickets, Nova Scotia to North Dakota New Jersey, Kentucky and Missouri. June–Aug.

133. Carex Fràseri Andr. Fraser's Sedge. (Fig. 803.)

Carex Fraseri Andr. Bot. Rep. *pl. 639.* 1811.
Carex Fraseriana Sims, Bot. Mag. *pl. 1391.* 1811.

Glabrous, culms smooth, slender, reclining, 10′–18′ long. Basal leaves 8′–16′ long, 1′–2′ wide, perfectly flat, firm, spreading, finely many-nerved with no midvein, obtuse or subacute at the apex, their margins usually finely crumpled in drying; culm leaves reduced to clasping basal sheaths; spike solitary, bractless, terminal, androgynous, ½′–1′ long, staminate above, pistillate below, the pistillate portion dense, about ½′ in diameter in fruit; perigynia ovoid, pale green, diverging, thin and somewhat swollen, faintly many nerved, fully 2″ long and rather more than 1″ in diameter, tipped with a short nearly truncate beak; scales ovate, obtuse, much shorter than the perigynia; stigmas 3.

In rich woods, southwestern Virginia, West Virginia, eastern Tennessee, and North Carolina. Ascends to 4000 ft. in North Carolina. Locally abundant. Our largest-leaved species. May–July.



134. Carex pícta Steud. Boott's Sedge. (Fig. 804.)

Carex Boottiana Benth.; Boott, Bost. Journ. Nat. Hist. 5: 112. 1845. Not H. & A. 1841.
Carex picta Steud. Syn. Pl. Cyp. 184. 1855.

Dioecious, foliage glabrous, light green, culm slender, smooth, erect or reclining, 6′–12′ long, usually much shorter than the leaves. Leaves flat, 1½″–3″ wide; spike solitary and terminal or rarely with a small accessory one near its base, erect, densely many-flowered, the staminate about 1′ long, the pistillate cylindric but narrowed at the base, 1′–2½′ long, 3″–4″ thick, subtended by a short purple sheath; perigynia obovoid, strongly many-nerved, pubescent at least toward the obtuse summit, about 1½″ long, narrowed at the base; scales purple, usually with green margins and midvein, shining, obovate, acute or cuspidate, longer and wider than the periygnia.

In woods, Indiana to Alabama and Louisiana. Local. Summer.

135. Carex scirpoidea Michx. Scirpus-like Sedge. (Fig. 805.)

Carex scirpoidea Michx. Fl. Bor. Am. 2: 171. 1803.

Dioecious, foliage glabrous, rather bright green, culms erect, slender but stiff, 6′–18′ tall, slightly rough. Leaves ½″–1″ wide, nearly erect, usually much shorter than the culm; spike solitary or rarely with an additional and very small one near its base, linear-cylindric, densely many-flowered, 8″–15″ long, 1½″–2″ in diameter, subtended by a short or sometimes sublate bract; perigynia oval, few-nerved, densely pubescent, 1″ long, ½″ thick, narrowed at the base, tipped with a very short beak; scales ovate-oval, dark purple with a narrow green midvein, acute, about as long as the perigynia; stigmas 3.

In rocky soil, Greenland to Alaska, south to the higher mountains of New England, Lake Huron, Utah and California. Also in northern Europe and Asia. Summer.

136. Carex Willdenòvii Schk. Willdenow's Sedge. (Fig. 806.)

Carex Willdenovii Schk. Riedgr. Nachtr. 33. *f.* 145. 1806.

Glabrous and pale green, culms very short, erect, 1′–4′ high. Leaves much elongated, nearly erect, rather stiff, 1″–1½″ wide, often 1° long, very much overtopping the spikes, lowest reduced to bladeless sheaths; spikes 1–5, androgynous, staminate above, pistillate below or sometimes completely staminate, about ½′ long, appearing nearly basal, one or more of them on filiform stalks 3′–7′ long, the stalks of the others much shorter; body of the perigynium oblong, smooth, 1″–1½″ long, rather less than 1″ thick, narrowed into a flattened 2-edged rough beak of about its own length; scales lanceolate, acute, acuminate or awned, finely several-nerved, the lower 1 or 2 commonly bract-like, foliaceous and often overtopping the staminate portion of the spike; stigmas 3.

In dry woods and thickets, Massachusetts to Ohio, Michigan and Manitoba, south to Florida, Kentucky and Texas. April–July.

137. Carex Jàmesii Schwein. James' Sedge. (Fig. 807.)

Carex Jamesii Schwein. Ann. Lyc. N. Y. 1: 67. 1824.
Carex Steudelii Kunth, Enum. 2: 480. 1837.

Similar to the preceding species, but the leaves rather narrower, soft, spreading or ascending, very much surpassing the spikes, the lowest mere clasping sheaths. Spikes androgynous, one or more of them filiform-stalked, the terminal staminate portion very slender, the pistillate flowers only 1–4 and slightly separated; body of the perigynium subglobose, 1″ in diameter, contracted at the base, abruptly tipped by a subulate rough beak of more than its own length; lower scales bract-like, foliaceous, commonly much overtopping the staminate portion of the spike, the upper shorter and sometimes not exceeding the perigynia; stigmas 3.

In dry woods and thickets, southern Ontario and New York to Indiana and Michigan, south to West Virginia and Missouri. April–May.

138. Carex durifòlia Bailey. Back's Sedge. (Fig. 808.)

Carex Backii Boott; Hook. Fl. Bor. Am. 2: 210. *pl. 209.* 1840. Not *C. Backana* Dewey, 1836.

Carex durifolia Bailey, Bull. Torr. Club, 20: 428. 1893.

Glabrous, culms scarcely 1′ high. Leaves ascending or spreading, 6′–12′ long, 1½″–3″ wide, very much overtopping the spikes; spikes 1–3, nearly basal, androgynous, 1 or 2 of them very slender-stalked, the staminate flowers few, terminal, inconspicuous, the pistillate 2–6, subtended by leafy bract-like elongated scales which nearly enclose the inflorescence; perigynia oval, smooth, gradually tapering into a stout subulate beak nearly or quite as long as the body, which is about 1½″ long and 1″ thick; stigmas 3.

In woods and thickets, Ontario to Manitoba, south to Massachusetts, New York, Ohio and Michigan. Also in Colorado (according to Bailey). May–June.

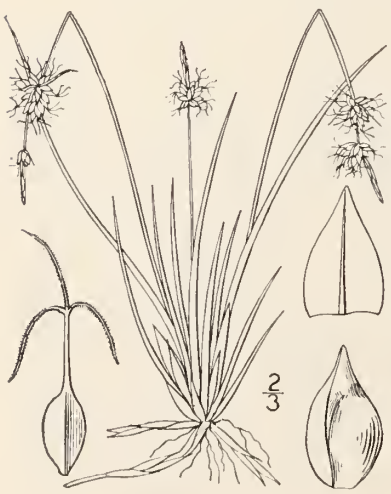
139. Carex rupéstris All. Rock Sedge. (Fig. 809.)

Carex rupestris All. Fl. Ped. 2: 264. *pl. 92. f. 1.* 1785.
Carex Drummondiana Dewey, Am. Journ. Sci. 29: 251. 1836.

Culms rather stout, obtusely 3-angled, erect, 1′–6′ tall. Leaves ½″–1″ wide, involute in drying, often curved, shorter than or exceeding the culm; bract subulate, erect, shorter than the terminal solitary androgynous spike or wanting; spike 6″–12″ long, the pistillate flowers few, basal; perigynia erect, smooth, obovoid or elliptic, firm, faintly few-nerved, about 2″ long, the beak stout, cylindric, about one-half as long as the body; scales purple-brown, ovate, obtuse or subacute, wider and longer than the perigynia; stigmas 3.

Labrador and Greenland to British Columbia, south in the Rocky Mountains to Colorado. Also in northern Europe and Asia. Summer.

140. Carex supìna Willd. Weak Arctic Sedge. (Fig. 810.)



Carex supina Willd.; Wahl, Kongl. Vet. Acad. Handl. (II.) 24: 158. 1803.

Glabrous, densely tufted, culms slender or nearly filiform but erect, sharply 3-angled, 4′–10′ tall. Leaves about ½″ wide, rough-margined, flat, shorter than the culm, erect or reclining; lower bract short, subulate; staminate spike solitary, sessile or very nearly so, 3″–6″ long; pistillate spikes 1–3, sessile near the summit of the culm, subglobose or oblong, few-flowered, 2″–3″ long, the upper one sometimes consisting of only 1–3 flowers; perigynia ovoid, smooth, hard, nerveless, about 1″ long, less than ½″ thick, 3-angled, tipped with a very short beak; scales ovate, brown-purple or lighter-margined, obtuse or subacute, equalling or rather longer than the perigynia; stigmas 3.

Northern Minnesota (according to Bailey) and Manitoba to arctic America and Greenland. Also in northern Europe and Asia. Summer.

141. Carex leptàlea Wahl. Bristle-stalked Sedge. (Fig. 811.)

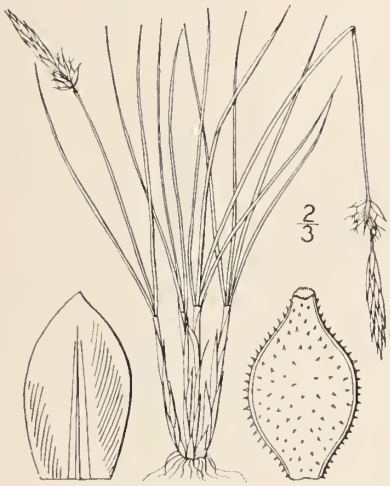
Carex leptalea Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 139. 1803.

Carex polytrichoides Willd.; Wahl. loc. cit. as synonym. 1803.

Light green and glabrous, culms filiform, smooth, erect or spreading, 6′–18′ long. Leaves not over ¼″ wide, mostly shorter than the culm; spike solitary, terminal, androgynous, narrowly linear, 2″–7″ long, rather less than 1″ thick, staminate above, pistillate below; perigynia few, linear-oblong, light green, many-nerved, narrowed at the base, obtuse and beakless at the summit, about 1½″ long and slightly more than ½″ thick; scales membranous, the upper obtuse and shorter than the perigynia, the lower acute, the lowest sometimes attenuated into a subulate awn nearly as long as the spike; stigmas 2–3.

In bogs and swamps, Newfoundland to British Columbia, south to Florida, Louisiana, Texas, Colorado and Oregon. Ascends to 4300 ft. in North Carolina. June–Aug.

142. Carex filifòlia Nutt. Thread-leaved Sedge. (Fig. 812.)



Carex filifolia Nutt. Gen. 2: 204. 1818.

Densely tufted, pale green and glabrous, culms very slender, smooth, erect, 3′–14′ tall, equalling or longer than the leaves. Leaves filiform, rather stiff, about ¼″ wide, their sheaths persistent and ultimately fibrillose; spike solitary, erect, bractless, staminate above, pistillate below, 3″–15″ long, the pistillate part about 2″ in diameter; perigynia obovoid-oval, triangular, few-nerved or nearly nerveless, rough or somewhat pubescent at the summit, 1″ long, rather more than ½″ thick, abruptly tipped by a short cylindric hyaline entire beak; scales broadly oval, concave with wide scarious margins, obtuse or cuspidate, about as long as the perigynia but much broader; stigmas 3.

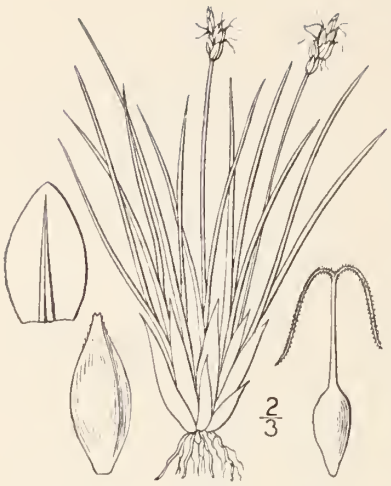
In dry soil, Manitoba to British Columbia, south to Nebraska, Colorado and California. May–July.

143. Carex capitàta L. Capitate Sedge. (Fig. 813.)

Carex capitata L. Sp. Pl. Ed. 2, 1376. 1763.

Culms very slender or filiform, stiff, strictly erect, 2′–18′ tall, smooth or very nearly so. Leaves filiform, involute, erect, shorter than the culm; spike solitary, terminal, ovoid, bractless, 2″–4″ high, about 2″ in diameter, staminate above, pistillate below; perigynia oblong-elliptic, ascending or nearly erect, light brown, nerveless or very faintly few nerved, 1″ long, ½″ thick, tipped with a nearly entire dark brown beak about one-fourth as long as the body; scales broadly ovate, membranous, brown, obtuse or acute, shorter and rather broader than the perigynia; stigmas 2.

Greenland and Labrador to the Northwest Territory and on the higher summits of the White Mountains of New Hampshire. Also in Europe. Summer.



144. Carex nàrdina Fries. Nard Sedge. (Fig. 814.)

Carex nardina Fries, Mant. 2: 55. 1839.

Culms filiform, smooth, erect, 2′–5′ tall, very densely tufted. Leaves filiform, erect, about as long as the culms; spike solitary, terminal, erect, ovoid-oblong, 3″–6″ long, less than 2″ in diameter, bractless, staminate above, pistillate below; perigynia oblong-elliptic, yellowish brown, nerveless, nearly erect, narrowed at both ends, nearly 2″ long, slightly over ½″ wide, somewhat hispid above, beakless, the orifice 2-toothed; scales ovate, brown, thin, acute or cuspidate or the upper obtuse, rather longer than the perigynia; stigmas 2.

Labrador and Hudson Bay to British Columbia. Summer.

145. Carex Redowskyàna C. A. Meyer. Redowsky's Sedge. (Fig. 815.)

Carex Redowskyana C. A. Meyer, Mem. Acad. St. Petersb. Div. Sav. 1: 207. *pl. 4.* 1825–31.

Carex gynocrates Wormsk.; Drejer, Rev. Crit. Car. 16. 1841.

Culms very slender, stiff, erect, 3′–8′ tall. Leaves almost bristle-form, erect, shorter than or equalling the culm; spike solitary, oblong, terminal, erect, 2″–8″ long, staminate above, pistillate below, the pistillate part 2″–3″ thick, or sometimes wholly staminate or pistillate; perigynia ovoid-ellipsoid, stipitate, dark brown, 1″–1½″ long, spreading or reflexed when mature, strongly several-nerved, little compressed, rough above, narrowed into a very short 2-toothed beak; scales ovate, light brown spreading, acute or cuspidate, shorter than or equalling the perigynia; stigmas 2.

In bogs, Labrador to the Northwest Territory, south to Vermont, Pennsylvania (according to Bailey), Michigan and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

146. Carex exilis Dewey. Coast Sedge. (Fig. 816.)

Carex exilis Dewey, Am. Journ. Sci. 14: 351. 1828.

Culms very slender or filiform, stiff, strictly erect, nearly or quite smooth, 10′–2° tall. Leaves involute-filiform, equalling or usually shorter than the culm; spike solitary, terminal, erect, bractless, 3″–18″ long, staminate below and pistillate above or sometimes staminate above and pistillate below, occasionally quite dioecious, very rarely with a small auxiliary spike at its base; perigynia ovoid-ellipsoid, somewhat impressed at the base, brown, about 1½″ long, rather strongly several-nerved on the outer face, faintly few-nerved on the inner, spreading or reflexed at maturity, narrowed into a slender rough 2-toothed beak about one-half as long as the body; scales ovate, acute, equalling or shorter than the perigynia; stigmas 2.

In bogs, Newfoundland and Labrador to southern New Jersey, mostly near the coast. Reported from Minnesota. May–July.

147. Carex chordorhìza L. f. Creeping Sedge. (Fig. 817.)

Carex chordorhiza L. f. Suppl. 414. 1781.

Rootstocks slender, creeping, culms slender, erect or nearly so, 8′–18′ tall. Leaves 1″–1½″ wide, shorter than the culm, somewhat involute in drying, straight, the lower ones of the culm reduced to short sheaths; spikes 2–4, aggregated into a terminal ovoid or oblong head 4″–6″ long; staminate flowers terminal; perigynia ellipsoid, slightly more than 1″ long and nearly 1″ wide, flat on the inner side, convex on the outer, strongly many-nerved, abruptly tipped by a short entire beak; scales ovate or ovate-lanceolate, acute or acuminate, equalling the perigynia or a little longer; stigmas 2.

In bogs and shallow water, Anticosti to Hudson Bay and the Northwest Territory, south to Maine, New York, northern Pennsylvania, Illinois and Iowa. Also in Europe. Summer.

148. Carex incúrva Lightf. Curved Sedge. (Fig. 818.)

Carex incurva Lightf. Fl. Scot. 544. *pl. 24. f. 1.* 1777.

Densely tufted, culms rather stiff, smooth, often curved, 1′–6′ long. Leaves less than 1″ wide, shorter than or equalling the culm, usually curved; spikes 2–5, sessile and aggregated into an ovoid or globose dense head 5″–8″ in diameter, appearing like a solitary spike; staminate flowers few, borne at the tops of the spikes; perigynia ovate, slightly swollen, compressed, 1½″ long, 1″ wide, contracted at the base and narrowed above into a short conic entire beak, faintly several–many-nerved, scales ovate, brown or brownish, acute or subacute, membranous, shorter than the perigynia; stigmas 2.

Greenland and Hudson Bay to British Columbia, south in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

149. Carex stenophýlla Wahl. Involute-leaved Sedge. (Fig. 819.)

Carex stenophylla Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 142. 1803.

Densely tufted and strongly stoloniferous, pale green, culms smooth, stiff, erect, 3′–8′ high. Leaves involute, about ½″ wide, shorter than or equalling the culm; inflorescence much as in the preceding species; perigynia ovate or ovate-oval, about 1″ long, faintly several-nerved, flat on the inner face, low-convex on the outer, gradually narrowed into a short entire beak; scales ovate, brownish, membranous, acute or acuminate, about equalling the perigynia; stigmas 2.

In dry soil, Manitoba to British Columbia, south to Iowa, Nebraska and Colorado. Also in Europe and Asia. June–Aug.

150. Carex Douglásii Boott. Douglas' Sedge. (Fig. 820.)

Carex Douglasii Boott; Hook. Fl. Bor. Am. 2: 213. *pl. 214.* 1840.

Light green, rootstock extensively creeping, culms slender, erect, smooth or nearly so, 4′–12′ tall. Leaves 1″ wide or less, somewhat involute in drying, sometimes longer than the culm, tapering to a long point; spikes narrowly oblong, acute, 4″–6″ long, several or numerous in a dense terminal oblong or ovoid cluster 1′–2′ long; staminate flowers terminal or variously distributed, whole spikes occasionally staminate or the plants even dioecious; perigynia ovate-lanceolate, about 1½″ long, faintly several-nerved, on both sides, narrowed at the base, the slender tapering beak more than one-half as long as the body; scales pale greenish brown, lanceolate, scarious, smooth-awned, 2–4 times longer than the perigynia and completely concealing them; stigmas 2.

In dry soil, Manitoba to Nebraska and New Mexico, west to British Columbia and California. June–Aug.

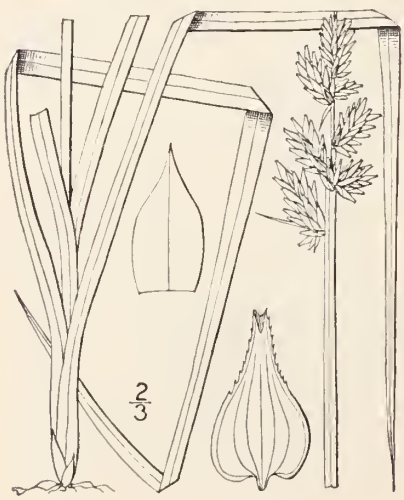
151. Carex arenària L. Sand Sedge. Sand-star. (Fig. 821.)

Carex arenaria L. Sp. Pl. 973. 1753.

Rootstock extensively creeping, culms erect, slender, slightly scabrous above, 4′–15′ high. Leaves 1″ or less wide, very long-pointed, shorter than the culm; lower bract subulate, sometimes 1½′ long; spikes oblong, 3″–5″ long, aggregated into a terminal ovoid cluster 1′–2′ long, the terminal commonly staminate, the middle ones staminate at the top, the lower usually wholly pistillate; perigynia lanceolate, 1½″–2″ long, strongly several-nerved on both sides, the flat strongly 2-toothed beak nearly as long as the body and decurrent on its summit; scales lanceolate, light brown, long-acuminate or awned, about equalling the perigynia; stigmas 2.

On sea beaches near Norfolk, Virginia. Adventive or naturalized from Europe. June–July.

152. Carex conjúncta Boott. Soft Fox Sedge. (Fig. 822.)



Carex vulpina Carey, in A. Gray, Man. 541. 1848. Not L. 1753.
Carex conjuncta Boott, Ill. 122. 1862.

Light green, culms smooth or roughish above, sharply 3-angled when fresh, flat when pressed, soft, erect, 1½°–3° tall. Leaves shorter than or sometimes equalling the culm, soft, flat, rough-margined, 2½″–3½″ wide; bracts small and bristle-like or wanting; spikes several or numerous, in a terminal elongated sometimes branched cluster, or the lower separated, the staminate flowers few, terminal; perigynia ovate-lanceolate or lanceolate, pale, 1½″ long, thickened at the base, strongly several-nerved, tapering into a roughish 2-toothed beak shorter than the body; scales oblong-lanceolate, cuspidate or short awned, about as long as the perigynia; stigmas 2.

In moist meadows and thickets, New Jersey (according to Bailey), southeastern Pennsylvania to Kentucky, Illinois and Minnesota. June–Aug.

153. Carex stipàta Muhl. Awl-fruited Sedge. (Fig. 823.)

Carex stipata Muhl.; Willd. Sp. Pl. 4: 233. 1805.

Culms smooth, rather weak, erect or nearly so, sharply 3-angled before drying, 1°–3½° tall. Leaves flat, 2″–4″ wide, shorter than the culm, the upper ones sometimes overtopping the spikes; bracts short, bristle-form or wanting; spikes numerous, yellowish brown, crowded into a terminal oblong cluster 1½′–4′ long, the lowest sometimes branched, the staminate flowers few, always terminal; perigynia lanceolate, strongly several-nerved, 2″–2½″ long, about 1″ wide at the base, gradually tapering into a rough flattened 2-toothed beak 1–2 times as long as the body, giving the clusters a peculiarly bristly aspect; scales ovate or lanceolate, thin, hyaline, acuminate, shorter than the perigynia; stigmas 2.

In swamps and wet meadows, Newfoundland to Ontario and British Columbia, south to Florida, Tennessee, Missouri, New Mexico and California. Ascends to 4200 ft. in Virginia. May–July.

154. Carex Crús-Córvi Shuttlw. Raven's-foot Sedge. (Fig. 824.)

Carex Crus-Corvi Shuttlw.; Kunze, Riedg. Suppl. 128. *pl. 32.* 1844.
Carex Halei Dewey, Am. Journ. Sci. (II.) 2: 248. 1846.

Pale green and glaucous, culms stout, 3-angled, rough above, erect, 2°–4° tall. Leaves flat, 2½″–6″ wide, rough-margined, sometimes equalling the culm, usually shorter; spikes yellowish brown, staminate above, very numerous in a large compound branching terminal cluster 4′–12′ long, 1′–3′ thick; perigynia elongated-lanceolate, strongly several-nerved, about 4″ long, with a short hard base and a subulate rough 2-toothed beak 3 or 4 times as long as the body; scales ovate or lanceolate, thin, very much shorter than the perigynia; stigmas 2.

In swamps, Indiana to southern Minnesota, south to Florida, Louisiana and Texas. May–July.

155. Carex decompósita Muhl. Large-panicled Sedge. (Fig. 825.)

Carex decomposita Muhl. Gram. 264. 1817.

Dark green, culms smooth, very obtusely angled or terete below, rather stout, erect, 1½°–3° tall. Leaves 2″–4″ wide, rough, rather stiff, longer than the culm, equitant at the base; spikes yellowish brown, staminate above, small and very numerous in a terminal decompound cluster 2′–5′ long, the lower branches ascending and 1′–2′ long; bracts subulate, ciliate or wanting; perigynia short-obovate, less than 1″ long, hard, somewhat shining, faintly few-nerved, abruptly tipped with a very short slightly 2-toothed beak; scales ovate, scarious-margined, about equalling the perigynia; stigmas 2.

In swamps, New York to Ohio and Michigan, south to Florida and Louisiana. May–Aug.

156. Carex màrcida Boott. Clustered Field Sedge. (Fig. 826.)

Carex marcida Boott; Hook. Fl. Bor. Am. 2: 212. *pl. 213.* 1840.

Light green, culms slender, sharply 3-angled, rough, at least above, 1°–2° tall. Leaves 1″ wide or less, much shorter than the culm; bracts short, subulate from a broader base, or wanting; spikes several, staminate at the summit or some of them wholly staminate, clustered in a terminal oblong or oblong-cylindric head about 1½′ long, the lower ones sometimes compound; perigynia ovate, dark brown, about 1″ long, faintly nerved, tapering into a flat serrate beak shorter than the body; scales ovate or ovate-lanceolate, brownish, membranous, acute or cuspidate, about equalling the perigynia; stigmas 2.

In dry soil, Manitoba to British Columbia, south to Nebraska, Kansas, New Mexico and Nevada. June–Sept.

157. Carex teretiúscula Gooden. Lesser Panicled Sedge. (Fig. 827.)

Carex teretiuscula Gooden. Trans. Linn. Soc. 2: 163. *pl. 19.* 1794.

Rather light green, culms slender, erect or reclining, very rough, at least above, 1°–2½° long. Leaves mostly less than 1″ wide, shorter than or sometimes equalling the culm; bracts very small or none; spikes several or numerous, staminate above, in a narrowly oblong compact or interrupted terminal cluster 1′–2′ long; perigynia ovate-oval, smooth, dark brown, hard, shining, few-nerved on the outer side, the body slightly more than ½″ long, truncate or rounded at the base, short-stalked, tapering into a flat conic beak about its own length; scales thin, ovate, brownish, acute or short-awned, about equalling the perigynia; stigmas 2.

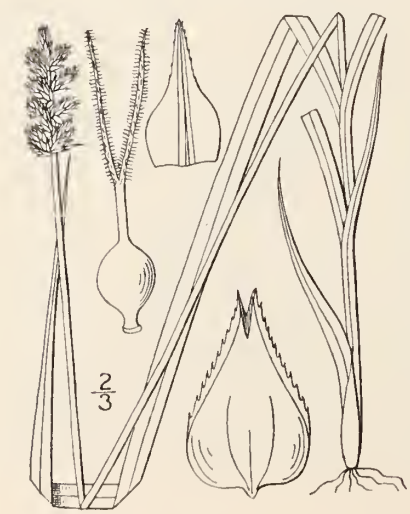
In swamps and wet meadows, Nova Scotia to Hudson Bay and British Columbia, Rhode Island, Pennsylvania and Nebraska. Also in Europe. May–July.

Carex teretiúscula prairea (Dewey) Britton.

Carex prairea Dewey, Wood's Classbook, 578. 1855.
Carex teretiuscula var. *ramosa* Boott, Ill. 145. 1867. Not *C. ramosa* Schk. 1806.

Cluster of spikes compound, branched, the top commonly nodding. Ontario to British Columbia, south to Massachusetts, Pennsylvania, Kentucky and Oregon.

158. Carex alopecoìdea Tuckerm. Foxtail Sedge. (Fig. 828.)



Carex cephalophora var. *maxima* Dewey, Am. Journ. Sci. 43: 92. 1842. Not *C. maxima* Scop. 1772.
Carex alopecoidea Tuckerm. Enum. Meth. 18. 1843.

Light green, culms stout but soft, sharply 3-angled, erect or reclining, 2°–3° long, roughish above. Leaves flat, 1½″–3″ wide, shorter than or equalling the culm; bracts almost filiform, commonly short; spikes several or numerous in a compact or somewhat interrupted cluster 1′–2′ long, rarely also a separated cluster subtended by a leaf-like bract; staminate flowers terminal; perigynia ovate or ovate-lanceolate, short-stipitate, 1½″–2″ long, pale brown, faintly few-nerved on the outer side, the tapering rough 2-toothed beak nearly as long as the body; scales ovate or oval, light brown, cuspidate or short-awned, about as long as the perigynia; stigmas 2.

In meadows, New York and Pennsylvania to Michigan and Manitoba (according to Macoun). Local.

Carex alopecoìdea spàrsispicàta Dewey, Am. Journ. Sci. (II.) 8: 350. 1849.
Spikes distinctly separated. Southeastern Michigan.

159. Carex grávida Bailey. Heavy Sedge. (Fig. 829.)

Carex gravida Bailey. Mem. Torr. Club, 1: 5. 1889.
Carex gravida var. *laxifolia* Bailey, loc. cit. 6. 1889.

Light green, culms slender, 1½°–3° tall, sharply 3-angled, erect, rough above. Leaves flat, 1½″–3″ wide, spreading or ascending, equalling or shorter than the culm; bracts filiform, usually very short; spikes several, in an oblong or ovoid-oblong dense heavy head 1′–1½′ long, pale, subglobose, the staminate flowers terminal; perigynia flat, spreading, broadly ovate or suborbicular, 1½″–2″ long, at least 1″ wide, rounded at the base, sessile or short-stalked, narrowed into a 2-toothed beak about one-third as long as the body, several-nerved on the outer face or nerveless; scales ovate-lanceolate, acute, cuspidate or short-awned, about as long as the perigynia; stigmas 2.

Illinois to South Dakota and Nebraska. May–July.

160. Carex vulpinoìdea Michx. Fox Sedge. (Fig. 830.)

Carex vulpinoidea Michx. Fl. Bor. Am. 2: 169. 1803.

Culms slender, stiff, sharply 3-angled, rough above, 1°–3° tall. Leaves 1″–2½″ wide, elongated, often exceeding the culm; bracts bristle-like, short or sometimes 2′–3′ long; spikes ovoid-oblong, densely flowered, 2″–4″ long, very numerous in a compact or somewhat interrupted cluster, 1½′–5′ long, the lower ones sometimes compound, staminate flowers terminal; perigynia ovate or the body broader than long, less than 1″ long, rather more than ½″ wide, greenish brown, flat, several-nerved on the outer face, nerveless or 1–3 nerved on the inner, ascending or spreading, tipped with a lanceolate 2-toothed beak about half as long as the body; scales lanceolate, acuminate or awned, about as long as the perigynia, but narrower; stigmas 2.

In swamps and wet meadows, New Brunswick to Manitoba, south to Florida, Louisiana, Nebraska and Texas. Ascends to 2500 ft. in Virginia. June–Aug.

161. Carex xanthocàrpa Bicknell. Yellow-fruited Sedge. (Fig. 831.)

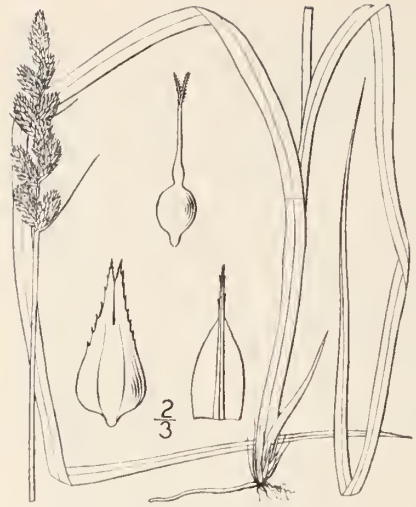
Carex xanthocarpa Bicknell, Bull. Torr. Club, 20: 22. 1896.

Culms rather stout, rough above, 1°–5° tall, much longer than the leaves. Leaves 1½″–3″ wide; head oblong or ovoid, usually dense, ¾′–2½′ long; spikes numerous, ovoid, many-flowered, short; staminate flowers terminal; bracts mostly short and inconspicuous; perigynia bright yellow, plano-convex, ovate-elliptic, about 1½″ long, with a narrowed or cuneate base and a short minutely 2-toothed beak, nerveless, or obscurely few-nerved on the outer face; scales acuminate, short-awned.

In fields, Massachusetts to New York and Ohio. June–Aug.

Carex xanthocàrpa annéctens Bicknell, Bull. Torr. Club, 23: 22. 1896.

Lower and slender; leaves 1″–2″ wide; head not over 1½′ long; bracts usually numerous and longer than the globose spikes; perigynia ovate or suborbicular. Abundant in the vicinity of New York.



162. Carex setàcea Dewey. Bristly-spiked Sedge. (Fig. 832.)

Carex setacea Dewey, Am. Journ. Sci. 9: 61. 1825.
Carex scabrior Sartw.; Boott, Ill. 3: 125. 1862.

Culms 1½°–4° tall, erect, rough above. Leaves 1°–2° long, 1″–3″ wide, shorter than the culm; head narrowly oblong, 1½′–2½′ long, 3″–5″ thick, sometimes branched at the base; bracts bristle-like, longer than the spikes or shorter; spikes ovoid or ovoid-oblong, 2½″–4″ long, usually close together; perigynia lanceolate or ovate-lanceolate, tapering from a more or less truncate base to a narrow rough 2-toothed beak, few-nerved, 1¼″–1½″ long.

New York and Massachusetts. Probably of wider distribution. June–Aug.

163. Carex Sartwéllii Dewey. Sartwell's Sedge. (Fig. 833.)

Carex Sartwellii Dewey, Am. Journ. Sci. 43: 90. 1842.

Culms slender, stiff, erect, rough above, 3-angled 1°–3° tall. Leaves 1″ 2″ wide, mostly shorter than the culm, long-attenuate at the apex; bracts setaceous, usually very small, or 1 or 2 of the lower sometimes elongated; spikes ovoid or oblong, 2″–4″ long, usually densely aggregated in a narrow cluster 1′–2′ long, or the lower somewhat separated; staminate flowers terminal or whole spikes occasionally staminate; perigynia elliptic-lanceolate or ovate-lanceolate, about 1″ long and rather more than ½″ wide, ascending, strongly several-nerved on both faces, tapering into a short 2-toothed beak; scales ovate, obtuse or subacute, pale brown, scarious-margined, about equalling the perigynia; stigmas 2.

In swamps, Ontario to British Columbia, south to central New York, Illinois, Michigan, Arkansas and Utah. May–July.

164. Carex tenélla Schk. Soft-leaved Sedge. (Fig. 834.)

Carex tenella Schk. Riedgr. 23. *f.* 104. 1801.

Light green, rootstocks very slender, culms almost filiform, rough, commonly reclining, 6′–2° long. Leaves soft, about ½″ wide, spreading, shorter than or sometimes equalling the culm; spikes very small, only 1–5-flowered, distant or the upper close together, the staminate flower or flowers uppermost; perigynia ovoid-ellipsoid, nearly terete, hard, finely many-nerved, about 1″ long and rather more than ½″ thick, tipped with a very minute entire beak; scales ovate, hyaline, acute, shorter than or the lower equalling the perigynia; stigmas 2.

In bogs, Newfoundland to British Columbia, south to New Jersey, Pennsylvania, Michigan, Colorado and California. Also in Europe. June–July.

Carex Eleócharis Bailey, Mem. Torr. Club, 1: 6, a very slender erect species, with 2 or 3 small brown 1–3-flowered spikes aggregated in a terminal head 1½″–2″ long, ovoid slightly swollen marginless plano-convex short-beaked perigynia, collected by Prof. Macoun on the Saskatchewan Plains, probably occurs within the northwestern limits of our area.

165. Carex rósea Schk. Stellate Sedge. (Fig. 835.)

Carex rosea Schk. Riedgr. Nachtr. 15. *f.* 179. 1806.

Rather bright green, culms very slender or filiform, erect or reclining, rough above, 1°–2½° long. Leaves flat, soft, spreading, 1″ or less wide, shorter than the culm; lower bract filiform or bristle-like, ½′–2½′ long; spikes 4–8, subglobose, 2″–3″ in diameter, 5–15-flowered, the 2 or 3 upper close together, the others distant; staminate flowers few, terminal; perigynia ovate-lanceolate, flat, bright green, stellately diverging, nerveless, shining, 1‴–1½″ long, rather more than ½″ wide, tapering into a stout 2-toothed beak about one-fourth the length of the body; scales ovate-oblong, white, hyaline, half as long as the perigynia; stigmas 2.

In woods and thickets, Newfoundland to Ontario and Manitoba, south to North Carolina, Nebraska and Missouri. Ascends to 2500 ft. in Virginia. May–July.

Carex rósea radiàta Dewey, Am. Journ. Sci. 10: 276. 1826.

Culms filiform, spreading; leaves about ½″ wide; spikes only 2–6-flowered, scattered; perigynia ascending, lanceolate, about ½″ wide. Ontario to Massachusetts, North Carolina and Kentucky.

166. Carex retrofléxa Muhl. Reflexed Sedge. (Fig. 836.)

Carex retroflexa Muhl.; Willd. Sp. Pl. 4: 235. 1805.
C. rosea var. *retroflexa* Torr. Ann. Lyc. 3: 389. 1836.

Culms very slender, erect, rather stiff, 8′–18′ tall, smooth or roughish above. Leaves about ½″ in width, mostly shorter than the culm; lower bract bristle-form, sometimes 2′ long, usually shorter; spikes 4–8, subglobose, 4-9-flowered, the upper all close together, the lower 2 or 3 separated; staminate flowers terminal or rarely variously intermixed with the pistillate; perigynia oblong-lanceolate or ovate-lanceolate, radiating or reflexed at maturity, about 1½″ long and a little more than ½″ wide, smooth, green-brown, compressed, but not as flat as those of the preceding species, somewhat corky-thickened at the base, tapering upwardly into a 2-toothed beak about one-third the length of the body; scales ovate, hyaline, about half as long as the perigynia; stigmas 2.

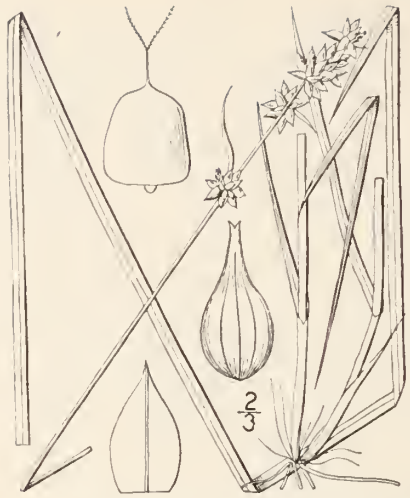
In woods and thickets, Massachusetts to Ontario, Michigan, Florida, and Texas. May–July.

167. Carex Texénsis (Torr.) Bailey. Texas Sedge. (Fig. 837.)

Carex rosea var. *Texensis* Torr.; Bailey, Mem Torr. Club, 1: 57. 1889.
Carex Texensis Bailey, Mem. Torr. Club, 5: 97. 1894.

Similar to the preceding species, culms very slender, erect, smooth, 6′–18′ tall. Leaves spreading or ascending, soft, about ½″ wide, shorter than the culm; lower bract commonly filiform, sometimes elongated; spikes 4–7, 4–10-flowered, all close together in a narrow head ½′–1½′ long, or the lower ones separated; perigynia narrowly lanceolate, green, nerveless, smooth, radiating or widely spreading, 1½‴–2‴ long, ½″ wide, the tapering beak about one-half as long as the body; scales lanceolate or ovate, hyaline, acute or acuminate, less than one-half as long as the perigynia; stigmas 2.

Southern Illinois (according to Bailey); Alabama to Texas. April–May.



168. Carex muricàta L. Lesser Prickly Sedge. (Fig. 838.)

Carex muricata L. Sp. Pl. 974. 1753.

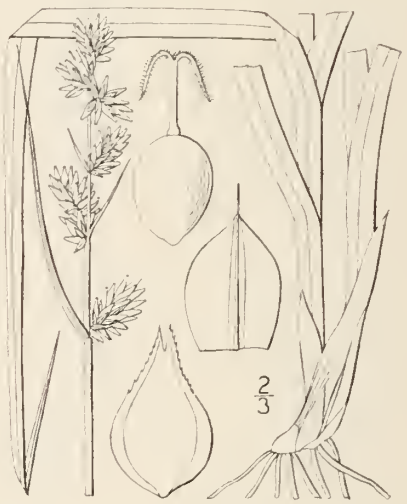
Bright green, culms slender, erect or reclining, roughish, at least above, 1°–2½° long. Leaves 1″–1½″ wide, shorter than the culm, bracts very short and subulate; spikes 5-10, 4–10-flowered, all clustered into an oblong head, or the lower 1 or 2 somewhat distant; perigynia ovate or ovate-lanceolate, 2″ long, 1″ wide, smooth, shining, nerveless, ascending when young, spreading or radiating when mature, not reflexed, tapering into a rough-edged 2-toothed beak as long as the body; scales ovate or ovate-oblong, green or brownish, acute, somewhat shorter than the perigynia; stigmas 2.

In meadows and fields, eastern Massachusetts to southern New York, Ohio and Virginia. Naturalized from Europe. June–Aug.

169. Carex sparganioìdes Muhl. Bur-reed Sedge. (Fig. 839.)

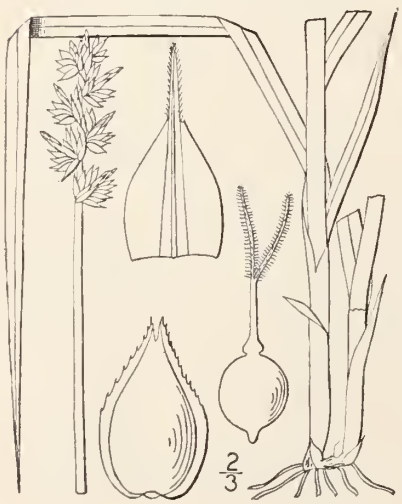
Carex sparganioides Muhl.; Willd. Sp. Pl. 4: 237. 1805.

Rather dark green with nearly white sheaths, culms stout or slender, rough, sharply 3-angled, 2°–3° tall. Leaves broad and flat, 2½″–4½″ wide, shorter than or sometimes overtopping the culm, the lower very short; spikes 6–12, oblong or subglobose, 2½″–4″ in diameter, several–many-flowered, the upper aggregated, the lower 2–4 commonly separated, sometimes compound and subtended by bristle-like bracts; perigynia flat, ovate, 1½″ long, 1″ wide, spreading or radiating, pale, narrowly wing-margined, rounded at the base, usually few-nerved on the outer face, the rough 2-toothed beak one-fourth to one-third the length of the body; scales ovate, hyaline, acute or cuspidate, about one half as long as the perigynia; stigmas 2.



In woods and thickets, Massachusetts to Ontario and Michigan, south to Virginia, Kentucky and Missouri. Ascends to 2100 ft. in Virginia. June–Aug.

170. Carex cephaloìdea Dewey. Thin-leaved Sedge. (Fig. 840.)



Carex muricata var. *cephaloidea* Dewey, Am. Journ. Sci. 11: 308. 1826.
Carex cephaloidea Dewey, Rep. Pl. Mass. 262. 1840.

Similar to the preceding species, culms slender or rather stout, erect but not stiff, rough above, 2°–3° tall. Leaves flat, 2″–4″ wide, thin and lax, somewhat shorter than the culm; bracts bristle-form, usually short, sometimes wanting; spikes 4–8, subglobose, aggregated but commonly distinct, in an oblong cluster 9″–15″ long, the staminate flowers terminal; perigynia ovate or ovate-lanceolate, greenish brown, nearly 2″ long, 1″ wide, ascending, nerveless or faintly few-nerved, tapering into a rough 2-toothed beak one-fourth to one-third as long as the body; scales ovate, white, membranous with a green midvein, short-cuspidate or awned, about one-half as long as the perigynia; stigmas 2.

In dry fields and on hills, Massachusetts to Pennsylvania, Illinois, Michigan and Wyoming. May–July.

171. Carex cephalóphora Muhl. Oval-headed Sedge. (Fig. 841.)

Carex cephalophora Muhl.; Willd. Sp. Pl. 4: 220. 1805.

Pale green, culms slender, erect, rough above, 10′–2° tall. Leaves 1″–2″ wide, sometimes overtopping the culm, usually shorter; bracts of the lower spikes short, bristle-form; spikes few, subglobose, densely clustered in a terminal short-oblong head 4″–8″ long, the staminate flowers terminal; perigynia broadly ovate, 1″ long or less, pale, nerveless or very faintly few-nerved, tipped with a 2-toothed beak about one-fourth the length of the body; scales ovate, thin, rough-cuspidate or awned, equalling or a little shorter than the perigynia; stigmas 2.

In dry fields and on hills, Maine and Ontario to Manitoba, south to Florida, Missouri and Texas. Ascends to 2500 ft. in Virginia. May-July.

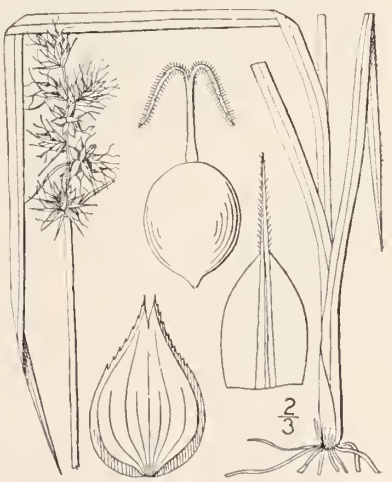
172. Carex Leavenwórthii Dewey. Leavenworth's Sedge. (Fig. 842.)

Carex Leavenworthii Dewey, Am. Journ. Sci. (II.) 2: 246. 1846.
Carex cephalophora var. *angustifolia* Boott, Ill. 123. 1862.

Similar to the preceding species but smaller, culms very slender or almost filiform, erect, roughish, 6′–15′ tall. Leaves much narrower, ½″–1½″ wide, mostly shorter than the culm; bracts of the lower spikes short, bristle-form or wanting; spikes 4–7, densely crowded in an obloug head 4″–8″ long, similar to that of *C. cephalophora* but usually smaller, the lower sometimes compound, the staminate flowers terminal; perigynia orbicular-ovate, rather less than 1″ long and about as wide, tipped with a very short 2-toothed beak; scales ovate, acute or cuspidate, shorter and narrower than the perigynia; stigmas 2.

In meadows, Missouri to Louisiana, Arkansas and Texas. May-June.

173. Carex Muhlenbérgii Schk. Muhlenberg's Sedge. (Fig. 843.)



Carex Muhlenbergii Schk. Riedgr. Nachtr. 12. *f. 178.* 1806.

Light green, culms sleuder but stiff and erect, sharply 3-angled, rough, at least above, 1°–2½° tall. Leaves 1″–2″ wide, usually shorter than the culm, somewhat involute in drying; bracts bristle-form, usually short; spikes 4–10, ovoid or subglobose, distinct but close together in an oblong head 9″–15″ long, the stamiuate flowers terminal; perigynium broadly ovate-oval, 1½″ loug, 1″ wide, strongly nerved on both faces, ascending, tipped with a short 2-toothed beak; scales hyaline with a green midvein, ovate-lanceolate, rough-cuspidate or short-awned, narrower aud mostly longer than the perigynia; stigmas 2.

In dry fields and on hills, Massachusetts to Ontario and Minnesota, south to Florida and Texas. May-July.

Carex Muhlenbérgii Xalapénsis (Kunth.) Britton, Mem. Torr. Club, 5: 86. 1894:
Carex Xalapensis Kunth, Enum. 2: 380. 1837.
Carex Muhlenbergii var. *enervis* Boott, Ill. 124. 1862.

Perigynia nearly or quite nerveless; leaves broader and longer. Southern New York to Missouri, Texas and Mexico.

174. Carex stérilis Willd. Little Prickly Sedge. (Fig. 844.)

Carex sterilis Willd. Sp. Pl. 4: 208. 1805.
C. echinata var. *microstachys* Boeckl. Linnaea, 39: 125. 1875.
Carex sterilis var. *angustata* Bailey, Bull. Torr. Club, 20: 425. 1893.
Carex sterilis var. *excelsior* Bailey, loc. cit. 424. 1893.

Culms slender, stiff, erect or rarely spreading, 8′–18′ tall, rough, at least above. Leaves ½″–1″ wide, shorter than the culm; bracts very short or sometimes bristle-form; spikes 3–5, subglobose or short-oblong, contiguous or separated, about 2½″ thick; staminate flowers basal, usually numerous at the bottom of the upper spike, or whole spikes occasionally staminate, or plants rarely quite dioecious; perigynia pale, lanceolate, compressed, spreading or reflexed when old, 1½″ long, ½″ wide, several-nerved on both faces, thickened at the base, tapering into a sharp-edged 2-toothed rough beak more than one-half as long as the body; scales ovate, hyaline, shorter than the perigynia; stigmas 2.

In moist soil, Newfoundland to British Columbia, south to Florida, Louisiana, Colorado and California. Ascends to 4000 ft. in Virginia. Variable. May–July.

Carex stérilis cephalántha Bailey, Bull. Torr. Club, 20: 425. 1893.
Carex echinata var. *cephalantha* Bailey, Mem. Torr. Club, 1: 58. 1889.

Stouter, sometimes 2° tall. Spikes 4–8, contiguous or separated; flowers more numerous; perigynia rather larger; spikes very bristly. Range nearly that of the species; perhaps merely a stout form.

175. Carex Atlántica Bailey. Eastern Sedge. (Fig. 845.)

Carex stellulata var. *conferta* Chapm. Fl. S. States, 534. 1860. Not *C. conferta* Koch.
Carex Atlantica Bailey, Bull. Torr. Club, 20: 425. 1893.

Similar to large forms of the preceding species but stouter, culms very rough above, 1°–2½° tall. Leaves 1″–1½″ wide, stiff, flat or in drying somewhat involute, the upper sometimes overtopping the spikes; spikes 4–7, spreading, subglobose or short-cylindric, nearly 3″ in diameter, several–many-flowered, the staminate flowers numerous at the base of the terminal one, or this rarely entirely staminate; perigynia broadly ovate, flat, sharp-margined, 1″–1½″ long, 1″ wide, cordate or rounded at the base, strongly several-nerved on the outer face, few-nerved on the inner, spreading or reflexed at maturity, abruptly tipped with a stout, rough 2-toothed beak about one-third as long as the body; scales shorter than the perigynia.

In swamps, Newfoundland to Florida. June–July.

176. Carex intèrior Bailey. Inland Sedge. (Fig. 846.)

Carex interior Bailey, Bull. Torr. Club, 20: 426. 1893.

Similar to *C. sterilis*, culms very slender, wiry, rather stiff, erect, 1°–2° tall. Leaves only about ½″ wide, shorter than the culm; bract of the lower spike very short; spikes 2–4, nearly globular, somewhat separated, several-flowered, 2″ in diameter, the terminal one staminate at the base; perigynia ovate or ovate-lanceolate, 1″ or less long, about ½″ wide, faintly few-nerved on the outer face, nearly nerveless on the inner, thickened, rounded or subcordate at the base, spreading or reflexed when old, tapering into a nearly smooth 2-toothed beak one-third to one-half as long as the body; scales ovate, acute or obtusish, shorter than the perigynia; stigmas 2.

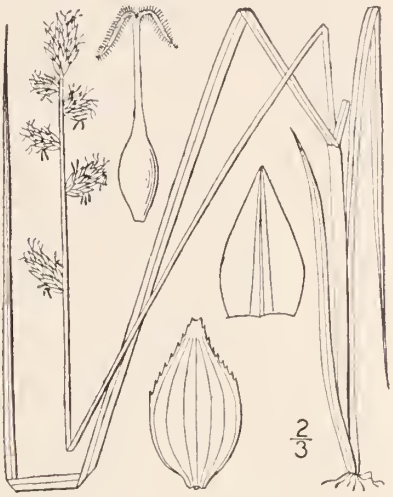
Wet soil, Maine to Minnesota, Florida and Kansas. Differs from *C. sterilis* in its shorter, shorter-beaked and weaker-nerved perigynia. May–July.

Carex intèrior capillàcea Bailey, Bull. Torr. Club, 20: 426. 1893.
Leaves about ¼″ wide; perigynia ovate, cordate, strongly nerved. Massachusetts to Pennsylvania.

177. Carex canéscens L. Silvery Sedge. (Fig. 847.)

Carex canescens L. Sp. Pl. 974. 1753.

Pale green and somewhat glaucous, culms slender, erect, roughish above, 10′–2½° tall. Leaves flat, ½″–1″ wide, shorter than the culm; bracts very short or none, or the lowest occasionally bristle-form and longer than its spike; spikes 4–9, short-oblong or subglobose, sessile, densely many-flowered, 2½″–5″ long, about 2″ in diameter, scattered or the upper close together; staminate flowers basal; perigynia oval or ovate-oval, silvery green or nearly white, faintly few-nerved, ascending, blunt-edged, rather less than 1″ long, about ½″ wide, rough above, tipped with a minute entire beak; scales hyaline, ovate, acute or obtuse, slightly shorter than or as long as the perigynia; stigmas 2.



In swamps and bogs, Newfoundland to British Columbia, south to Virginia, Michigan, Colorado and Oregon. Ascends to 4200 ft. in Virginia. Also in Europe and Asia. May–July.

178. Carex brunnéscens (Pers.) Poir. Brownish Sedge. (Fig. 848.)

Carex curta var. *brunnescens* Pers. Syn. 2: 539. 1807.
C. canescens var. *alpicola* Wahl. Fl. Lapp. 232. 1812.
C. brunnescens Poir. in Lam. Encycl. Suppl. 3: 286. 1813.

Rather dark green, not glaucous, culms slender, stiff, erect, roughish above, 8′–18′ tall. Leaves 1″ wide or less, shorter than the culm; lower bract bristle-form and longer than its spike, or short, or none; spikes 4–8, subglobose or short-oblong, few-flowered, rarely over 2½″ long, scattered, or the upper close together; staminate flowers basal; perigynia ascending or spreading, brown, smaller than those of the preceding species, less than 1″ long, tipped with a manifest beak about one-fourth as long as the body; scales ovate, membranous, brownish, about equalling the perigynia; stigmas 2.

In wet places, mostly at high altitudes, Labrador to British Columbia, New York and New England, on the southern Alleghenies, and the Rocky Mountains. Also in Europe. Ascends to 6600 ft. in North Carolina. Summer.

Carex brunnéscens gracilior Britton.
Carex canescens var. *vulgaris* Bailey, Bot. Gaz. 13: 86. 1888. Not *C. vulgaris* Fries, 1842.
Culms nearly filiform, weak, often spreading; spikes 4–8-flowered; perigynia spreading, longer-beaked. Range of type, mostly at lower altitudes. Perhaps a distinct species.

179. Carex Norvégica Willd. Norway Sedge. (Fig. 849.)

Carex Norvegica Willd.; Schk. Riedgr. 50. 1801.

Bright green, culms slender but stiff and erect, slightly scabrous above, 6′–16′ tall. Leaves 1″ wide or less, shorter than the culm; bracts very short or wanting; spikes 3–6, brown, oblong or subglobose, scattered or rather close together, densely many-flowered, 3″–6″ long, about 2″ in diameter; staminate flowers basal, very numerous at the bottom of the upper spike; perigynia ascending, about 1″ long, elliptic, blunt-edged, narrowed at both ends, brownish, finely many-nerved, tipped with a very short rough beak; scales ovate or oval, brown, obtuse, rather shorter than the perigynia; stigmas 2.

Along salt meadows, Maine to Anticosti. Reported from Minnesota. Also in Europe. Summer.

180. Carex àrcta Boott. Northern Clustered Sedge. (Fig. 850.)

Carex canescens var. *polystachya* Boott; Richards. Arct. Exp. 2: 344. 1851. Not *C. polystachya* Sw. 1803. *Carex arcta* Boott, Ill. 155. *pl. 497.* 1867.

Rather light green but not glaucous, culms slender, usually strictly erect, 1°–2½° tall, rough above, longer than or sometimes overtopped by the leaves which are flat and about 1″ wide. Lower bract bristle-form and longer than its spike, or short, or wanting; spikes oblong, many-flowered, 3″–4″ long, about 2½″ in diameter, all aggregated into a terminal ovoid cluster about 1′ long, the staminate flowers basal; perigynia pale, ovate, many-nerved, mostly spreading, tapering into a rough beak about one-half as long as the body; scales membranous, pale brown, usually acute, shorter than the perigynia; stigmas 2.

In swamps and wet woods, Maine and New Brunswick to Manitoba, Minnesota and British Columbia. June–July.

181. Carex tenuiflòra Wahl. Sparse-flowered Sedge. (Fig. 851.)

Carex tenuiflora Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 147. 1803.

Light green, culms very slender or filiform, erect or reclining, rough above, 8′–2° long. Leaves ½″ wide or rather more, flat, usually much shorter than the culm; spikes only 2–4, clustered at the summit, subglobose, few-flowered, about 2½″ in diameter, bractless or the lowest with a short bract; perigynia pale, elliptic, very obscurely few-nerved, narrowed at both ends, 1″–1¼″ long, more than ½″ wide, narrowed at both ends, beakless, spreading; staminate flowers basal; scales nearly white, hyaline, acute or obtusish, about equalling the perigynia; stigmas 2.

In bogs, New Brunswick to Manitoba, south to Maine, Vermont, central New York and Michigan. Local. Also in Europe. Summer.

182. Carex Heleonástes Ehrh. Hudson Bay Sedge. (Fig. 852.)

Carex Heleonastes Ehrh.; L. f. Suppl. 414. 1781.

Culms slender, stiff, erect, very rough above, 6′–18′ high. Leaves rigid, erect, becoming involute, less than 1″ wide, shorter than the culm; bracts very short or none; spikes 3–5, subglobose, several-flowered, brown, about 2½″ in diameter, clustered at the summit, the staminate flowers basal; perigynia broadly ovate or ovate-elliptic, blunt-edged, faintly several-nerved, about 1″ long, more than ½″ wide, tipped with a short sharp beak; scales ovate, brown with broad hyaline margins, about as long as the perigynia; stigmas 2.

Hudson Bay to Manitoba and the Canadian Rocky Mountains. Also in Europe. Summer.

183. Carex lagopìna Wahl. Arctic Hare's-foot Sedge. (Fig. 853.)

Carex lagopina Wahl. Kongl. Vet. Acad. Handl. (II.) **24**: 145. 1803.

Culms rough, stiff, erect, 6′–16′ tall. Leaves flat, not involute, 1″ or less wide, shorter than the culm, bracts very short or wanting; spikes 3–6, oblong, dark brown, narrowed at the base, 3″–4″ long, 1½″–2″ thick, densely many-flowered, clustered at the summit or the lower somewhat separated, the staminate flowers basal; perigynia elliptic or obovate, rather less than 1″ long, firm, several-nerved, narrowed at the base, rather abruptly tipped by the beak; scales ovate, brown, hyaline-margined, acute, shorter than the perigynia; stigmas 2.

Labrador and Greenland to Alaska, south in the Rocky Mountains to Utah. Also in northern Europe and Asia. Summer.

184. Carex glareòsa Wahl. Weak Clustered Sedge. (Fig. 854.)

Carex glareosa Wahl. Kongl. Vet. Acad. Handl. (II.) **24**: 146. 1803.

Closely resembles the preceding species, but has weak spreading or reclining culms 2′–18′ long. Leaves narrower, flat, about ½″ wide; spikes 2 or 3, oblong or subglobose, several-flowered, 2″–4″ long, about 1½″ in diameter, brown, subtended by very small scale-like bracts, the staminate flowers basal; perigynia oblong-oval, strongly several-nerved, less than 1″ long, about ½″ wide, short beaked; scales ovate, acute or obtusish, rich brown, about as long as the perigynia; stigmas 2.

Greenland and Hudson Bay to Gaspe, Quebec, west through arctic America to Alaska. Also in northern Europe and Asia. Summer.

Carex glareòsa ursìna (Dewey) Bailey, Carex Cat. 3. 1884.

Carex ursina Dewey, Am. Journ. Sci. **27**: 240. 1835.

Lower densely tufted; spikes smaller. Perhaps a mere form of the species. Arctic America.

185. Carex trispérma Dewey. Three-fruited Sedge. (Fig. 855.)

Carex trisperma Dewey, Am. Journ. Sci. **9**: 63. 1825.

Bright green, culms filiform, weak, usually reclining or spreading, very slightly roughened, 1°–2½° long. Leaves flaccid, flat, about ½″ wide, shorter than the culms; spikes 2 or 3, only 2–4-flowered, widely separated, the lowest subtended by a bristle-form bract ½′–3′ long; perigynia oblong, ascending, green, 1½″–2″ long, rather more than ½″ wide, very finely many-nerved, narrowed at both ends and tipped with a very short nearly entire beak; scales ovate or ovate-lanceolate, hyaline with a green midvein, acute, somewhat shorter than the perigynia; stigmas 2.

In swamps and wet woods, Newfoundland to Manitoba, south to Maryland, Ohio, Michigan and (according to Webber) to Nebraska. Ascends to 2500 ft. in Vermont. June–Aug.

186. Carex Deweyàna Schwein. Dewey's Sedge. (Fig. 856.)

Carex Deweyana Schwein. Ann. Lyc. N. Y. 1: 65. 1824.

Pale green, culms slender, spreading, nearly or quite smooth, 1°–2° long. Leaves 1″–1½″ wide, flat, soft, shorter than the culm; bracts bristle-form, the lower commonly elongated; spikes 3–6, oblong or subglobose, few-flowered, about 2½″ in diameter, sessile, distinctly separated or the upper ones contiguous; staminate flowers basal; perigynia lanceolate or ovate-lanceolate, thin, nerveless, 2″–2½″ long, rather less than 1″ wide, the inner face flat, the tapering rough strongly 2-toothed beak at least one-half as long as the body; scales nearly white, hyaline with a green midvein, cuspidate or acute, equalling the perigynia, or shorter; stigmas 2.

In dry woods, Nova Scotia to Manitoba and Oregon, south to Connecticut, Pennsylvania, Michigan, New Mexico and Utah. May–July.

187. Carex bromoides Schk. Brome-like Sedge. (Fig. 857.)

C. bromoides Schk. Riedgr. Nachtr. 8. *f. 176.* 1806.

Bright green, culms slender, erect or reclining, roughish above, 1°–2° long. Leaves 1″ wide or less, flat, soft, equalling or shorter than the culm; bracts subulate or bristle-form, the lowest commonly elongated, sometimes overtopping the spikes; spikes 3–7, narrowly oblong-cylindric, 4″–8″ long, about 1½″ thick, erect or ascending, mostly close together, loosely several–many-flowered, the staminate flowers either basal, basal and terminal, or forming whole spikes, the plant occasionally quite dioecious; perigynia linear-lanceolate, firm, pale, strongly several-nerved, 2″–2½″ long, ½″ wide, the inner face flat, the tapering rough 2-toothed beak at least one-half as long as the body; scales oblong-lanceolate, green, acute or acuminate, shorter than the perigynia; stigmas 2.

In bogs and swamps, Nova Scotia to Ontario and Michigan, south to Florida and Louisiana. June–Aug.

188. Carex praténsis Drejer. Northern Meadow Sedge. (Fig. 858.)

Carex pratensis Drejer, Rev. Crit. Car. 24. 1841.

Light green, culms slender, erect when young, the summit later nodding, nearly smooth, 1°–1½° tall. Leaves about 1″ wide, shorter than the culm, but the upper sometimes overtopping the spikes; lower bract bristle-form, usually short; spikes 3–6, oblong or club-shaped, separated or the upper contiguous, silvery-brown and shining, 3″–5″ long, about 2½″ in diameter, several-flowered, the staminate flowers basal; perigynia lanceolate, thin, pale, nerveless on the inner face, few-nerved on the outer, 2½″ long, nearly 1″ wide, wing-margined, tapering into a beak nearly as long as the body; scales membranous, lanceolate, acute or acuminate, about as long as the perigynia; stigmas 2.

Labrador to western Ontario, Michigan, Manitoba and Alaska, south in the Rocky Mountains to Colorado. Summer.

189. Carex xerántica Bailey. White-scaled Sedge. (Fig. 859.)

Carex xerantica Bailey, Coult. Bot. Gaz. 17: 151. 1892.

Similar to the preceding species but the culms are stout, stiff, and strictly erect, even when mature. Leaves about 1″ wide, involute in drying, shorter than the culm; spikes about 5, oblong, densely many-flowered, close together or the lower slightly separated, 4″–6″ long, about 2″ in diameter, the staminate flowers basal; perigynia lanceolate, pale, 2½″ long, 1″ wide, nerveless, conspicuously wing-margined, the inner face concave, the rough tapering beak about as long as the body; scales silvery white, lanceolate, acute or acuminate, equalling or a trifle longer than the perigynia; stigmas 2.

Western Manitoba and adjacent Northwest Territory. May–July.

190. Carex siccàta Dewey. Dry-spiked Sedge. Hillside Sedge. (Fig. 860.)

Carex siccata Dewey, Am. Journ. Sci. 10: 278. 1826.

Rootstocks long and stout, culms slender, erect, rough above, 1°–2° tall. Leaves erect, about 1″ wide, the upper sometimes overtopping the culm, the lower short; bracts short or the lowest bristle-form and elongated; spikes 3–6, oblong or subglobose, 2½″–4″ long, brownish or brown, clustered or more or less separated, the staminate flowers basal or variously situated or whole spikes staminate; perigynia ovate-lanceolate, firm, about 2½″ long and nearly 1″ wide, wing-margined, strongly several-nerved on both sides, the inner face, concave by the incurved margins, the tapering rough beak nearly as long as the body; scales ovate-lanceolate membranous, acute or acuminate, about equalling the perigynia; stigmas 2.

In dry fields and on hills, Ontario and Manitoba to British Columbia, south to Rhode Island, New York, Michigan, Arizona and California. May–July.

191. Carex Muskinguménsis Schwein. Muskingum Sedge. (Fig. 861.)

Carex Muskingumensis Schwein. Ann. Lyc. N. Y. 1: 66. 1824.
Carex arida Schwein. & Torr. Ann. Lyc. N. Y. 1: 312. 1825.

Culm stout, stiff, erect, very rough above, 2°–3° tall. Leaves flat, long-pointed, 1½″–2½″ wide, shorter than the fertile culms, those of sterile culms crowded near the summit; bracts very short and scale-like; spikes 6–12, oblong-cylindric, densely many-flowered, 6″–12″ long, about 2½″ in diameter, erect, close together, pale brown, narrowed and staminate at the base; perigynia narrowly lanceolate, ascending, about 4″ long and rather less than ½″ wide, strongly several-nerved, very flat, narrowed to both ends, scarious-margined, rough-ciliate, the tapering 2-toothed beak at least as long as the body; scales lanceolate, acuminate, one-third to one-half as long as the perigynia; stigmas 2.

In moist woods and thickets, Ohio to Michigan, Manitoba and Missouri. June–Aug.

192. Carex tribuloides Wahl. Blunt Broom Sedge. (Fig. 862.)

Carex tribuloides Wahl. Kongl. Vet. Acad. Handl. (II.) **24**. 145. 1803.
Carex lagopodioides Schk. Riedgr. Nachtr. 20. *f.* 177. 1806.
C. tribuloides var. *turbata* Bailey, Mem. Torr. Club, **1**: 55. 1889.

Bright green, culms usually stout, erect, roughish above, 8′–3° tall. Leaves flat, 1″–3″ wide, shorter than or the uppermost overtopping the culm; lower bract bristleform, sometimes elongated; spikes 6–20, oblong or sometimes top-shaped, blunt, densely clustered or sometimes separated, 3″–6″ long, about 2½″ thick; staminate flowers basal; perigynia lanceolate, thin, greenish brown, flat, ascending or erect, 2″–2½″ long, ½″–1″ wide, several-nerved on each face, with a sharply 2-toothed, rough wing-margined beak; scales lanceolate, whitish, acute, about half as long the perigynia; stigmas 2.

In meadows, New Brunswick to Manitoba, Florida and Arizona. Ascends to 2500 ft. in Virginia. July–Sept.

Carex tribuloides Bébbii Bailey, Mem. Torr. Club. **1**: 55. 1889.

More slender, spikes fewer, smaller (about 3″ long, commonly bractless, mostly clustered in a dense head 1′ long; perigynia broader and shorter. Range of the type.

Carex tribuloides moniliformis (Tuckerm.) Britton.

Carex scoparia var. *moniliformis* Tuckerm. Enum. Meth. 17. 1843.
Carex tribuloides var. *reducta* Bailey, Proc. Am. Acad. **22**: 118. 1886.

Slender, the culm much exceeding the leaves; spikes all or all but the uppermost separated, 2½″–4″ long, the rachis somewhat zigzag. Maine and New Brunswick to New York, west to North Dakota.

193. Carex scopària Schk. Pointed Broom Sedge. (Fig. 863.)

Carex scoparia Schk. Riedgr. Nachtr. 20. *f.* 175. 1806.
Carex scoparia var. *minor* Boott, Ill. 116. *pl.* 369. 1862.

Culms sleuder, erect, roughish above, ½°–2½° tall. Leaves less than 1½″ wide; lower bract bristle-form or wanting; spikes 3–10, oblong, narrowed at both ends, bright brown, 3″–8″ long, 2″–3″ in diameter, densely many-flowered, usually aggregated into an ovoid head 8″–18″ loug; staminate flowers basal; perigynia lanceolate, ascending or erect, 2″–3″ long, rather less than 1″ wide, narrowly wing-margiued, several-nerved on both faces, tapering into the ciliate 2-toothed beak; scales thin, brown, acuminate or cuspidate, shorter than the perigynia; stigmas 2.

In moist soil, Nova Scotia to Manitoba, Florida and Colorado. Ascends to 6200 ft. in North Carolina. July–Sept.

194. Carex leporina L. Hare's-foot Sedge. (Fig. 864.)

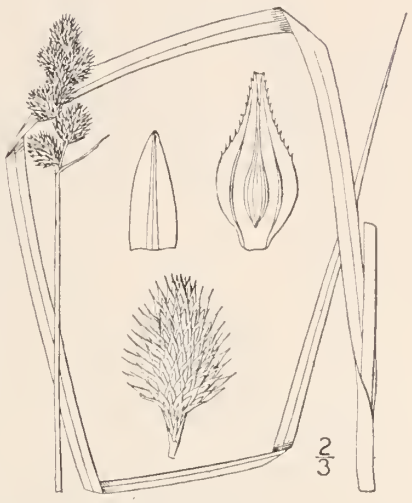
Carex leporina L. Sp. Pl. 973. 1753.

Culms slender, erect, roughish above, 1°–1½° tall. Leaves about 1″ wide, flat, shorter than the culm; bracts very short and scale-like or wanting; spikes 4–7, oblong, blunt at the summit, narrowed and staminate at the base, 4″–6″ long, about 3″ thick, dark brown, shiuing, clustered but distinct, in a terminal oblong head about 1′ long; perigynia ascending or appressed, ovate-lanceolate, 2″ long, nearly 1″ wide, rather narrowly wing-margined, several-nerved on both faces, the rough tapering 2-toothed beak nearly as loug as the body; scales lanceolate, brown, membranous, acute, narrower and shorter than the perigynia; stigmas 2.

Eastern Massachusetts. Adventive from Europe. Native in the Rocky Mountains. June–Aug.

195. Carex cristatélla Britton. Crested Sedge. (Fig. 865.)

Carex cristata Schwein. Ann. Lyc. N. Y. 1: 66. 1824. Not Clairv. 1811.
Carex tribuloides var. *cristata* Bailey, Proc. Am. Acad. 22: 148. 1886.



Culms slender or rather stout, 1½°–2½° tall, stiff, erect, roughish above, longer than the leaves. Leaves 1½″–2″ wide; lower bracts bristle-form, ¼′–1½′ long; heads 6–15, globose or subglobose, 2″–3″ in diameter, all densely aggregated into an oblong head 1′ long or more or the lower slightly separated; staminate flowers basal; perigynia lanceolate or ovate lanceolate, spreading or ascending, squarrose when mature, green or greenish brown, 1½″–2″ long, less than 1″ wide, narrowly wing-margined, several-nerved on both faces, tapering into a ciliate 2-toothed beak; scales lanceolate, nearly white, much shorter than the perigynia; stigmas 2.

In meadows and thickets, New Brunswick to Manitoba, south to Massachusetts, Pennsylvania, Illinois and Nebraska. Ascends to 2100 ft. in Virginia. July–Sept.

196. Carex adústa Boott. Browned Sedge. (Fig. 866.)

Carex adusta Boott; Hook. Fl. Bor. Am. 2: 215. 1840.

Culms stout, stiff, erect, entirely smooth, 1½°–2½° tall, growing in dense tufts. Leaves about 1″ wide, long-pointed, shorter than the culm; bracts subulate, tapering from a broad nerved base, the lower 1 or 2 usually elongated, nearly erect, often exceeding the spikes; spikes 5–12, subglobose or short-oval, several-flowered; densely clustered and apparently confluent, or slightly separated, bright greenish brown; staminate flowers basal; perigynia broadly ovate, firm, very narrowly wing-margined or wingless, rough above, plano-convex, 2″–2½″ long, 1″–1¼″ wide, tapering into a 2-toothed beak, several-nerved on the outer face, nerveless on the inner, ascending; scales lanceolate, acute or cuspidate, about equalling the perigynia; stigmas 2.

In dry soil, New Brunswick to the Northwest Territory, New York and Michigan. June–July.

197. Carex foènea Willd. Hay Sedge. (Fig. 867.)

Carex foenea Willd. Enum. 957. 1809.
Carex argyrantha Tuckerm.; Wood, Class-book, 753. 1860.

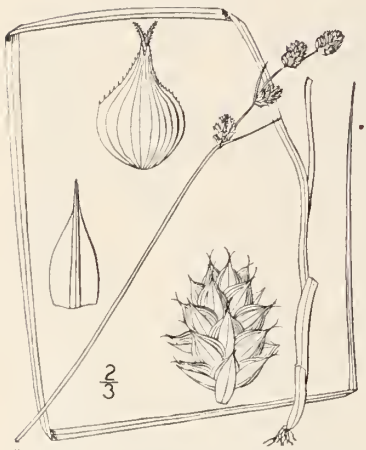
Rather light green, culm slender, smooth, erect or the summit nodding, 1°–3½° tall. Leaves flat, soft, 1″–2″ wide, shorter than the culm; bracts very short or wanting, or the lowest occasionally manifest; spikes 4–10, subglobose or short-oblong, narrowed at the base, 2½″–3″ in diameter, silvery green, all separated on a sometimes zigzag rachis or the upper contiguous; staminate flowers basal; perigynia ovate, thin, about 1½″ long and nearly 1″ wide, broadly wing-margined, strongly several-nerved on both faces, tapering into a short rough 2-toothed beak; scales hyaline, lanceolate, acuminate, about equalling the perigynia; stigmas 2.

In dry woods, often on rocks, New Brunswick to Pennsylvania, Minnesota and British Columbia. June–July.

Carex foènea perpléxa Bailey, Mem. Torr. Club, 1: 27. 1889.

Culms stouter, spikes commonly aggregated and larger, less contracted at the base, the summit of the culm erect or nearly so; perigynia thicker. Maine and Virginia to Minnesota.

198. Carex stramínea Willd. Straw Sedge. (Fig. 868.)



Carex straminea Willd.; Schk. Riedgr. 49. *f. 34.* 1801.

Culms very slender, roughish above, 1°–2½° long, the top commonly nodding or recurved. Leaves 1″ wide or less, long-pointed, shorter than the culm; bracts short or the lower bristle-form and exceeding its spike; spikes 3-8, subglobose or slightly obovoid, 2″–2½″ thick, yellowish brown or greenish, separated on the commonly zigzag rachis, or contiguous; staminate flowers basal; perigynia spreading or ascending, ovate, brown, about 1½″ long, rather more than ½″ wide, strongly several-nerved on the outer face, fewer-nerved on the inner, wing-margined, the tapering rough 2-toothed beak about as long as the body; scales lanceolate, acute, about equalling the perigynia, but narrower; stigmas 2.

In dry fields, New Brunswick to Manitoba, Pennsylvania, Michigan, and probably farther south. June-July.

Carex straminea mirábilis (Dewey) Tuckerm. Enum. Meth. 18. 1843.

Carex mirabilis Dewey, Am. Journ. Sci. **30**: 63. 1836.

Larger, culm slender, 2°–5° long; leaves 1″–2½″ wide; spikes larger, 3″–4″ thick, rather greener; perigynia spreading, narrower, longer than the scales. Range of the type, extending south to North Carolina and Missouri. Perhaps better regarded as a distinct species.

199. Carex silícea Olney. Sea-beach Sedge. (Fig. 869.)

Carex silicea Olney, Proc. Am. Acad. **7**: 393. 1868.
C. straminea var. *moniliformis* Tuckerm. Enum. Meth. 17. 1843. Not *C. scoparia* var. *moniliformis* Tuckerm. 1843.
Carex foenea var. *sabulonum* A. Gray, Man. Ed. 5, 580. 1867. Not *C. sabulosa* Turcz. 1837.

Culms slender, rather stiff, erect but the summit recurved or nodding, roughish above, 1°–2½° tall. Leaves 1″ wide or rather less, involute in drying, shorter than the culm; bracts always very short; spikes 5–8, ovoid-conic or ovoid-oblong, silvery-green, nearly white or becoming brownish, erect, conspicuously contracted and staminate at the base, 4″–6″ long, about 2½″ thick, all separated or the uppermost close together; perigynia ovate-oval, short-beaked, finely nerved on both faces, wing-margined, appressed, about 2″ long, more than 1″ wide, longer and broader than the lanceolate scales; stigmas 2.

In sands of the sea coast, Nova Scotia to New Jersey. June–Aug.

200. Carex ténera Dewey. Marsh Straw Sedge. (Fig. 870.)

Carex tenera Dewey, Am. Journ. Sci. **8**: 97. *f. 9.* 1824.
C. straminea var. *aperta* Boott, Ill. 120. *pl. 385.* 1862.
C. straminea var. *tenera* Bailey, Bot. Gaz. **10**: 381. 1885.

Culm very slender, erect or the summit nodding, roughish above 1°–2° high. Leaves shorter than the culm, usually less than 1″ wide, tapering to a very long point; bracts usually short or wanting, sometimes bristle-form; spikes 4–6, oval, obtuse, densely many-flowered, separated or the upper contiguous, greenish-brown, 4″–5″ long, staminate and commonly much contracted at the base; perigynia ovate to ovate-lanceolate, ascending, appressed, strongly several-nerved on both faces, wing-margined, the tapering rough beak more than half as long as the body; scales lanceolate, about as long as the perigynia, but much narrower; stigmas 2.

In wet soil, common along brackish marshes, Maine and Ontario to Virginia and Louisiana. May–June.

Carex ténera invisa (W. Boott) Britton.

Carex straminea var. *invisa* W. Boott, Coult. Bot. Gaz. **9**: 86. 1884.

Spikes smaller, subglobose or short-oblong, not more than 3″ thick, the lower one usually subtended by a filiform bract ½′–3½′ long. Maine to Delaware.

201. Carex festucàcea Willd. Fescue Sedge. (Fig. 871.)

Carex festucacea Willd. Sp. Pl. 4: 242. 1805.
Carex straminea var. *brevior* Dewey, Am. Journ. Sci. 11: 158. 1826.
C. straminea var. *festucacea* Tuck. En. Meth. 18. 1843.

Culms slender or rather stout, nearly or quite smooth, stiff, strictly erect, 1°–4° tall. Leaves rather stiff, erect, 1″–2″ wide, shorter than the culm; spikes 3–8, green-brown oblong or nearly globular, clustered at the summit but not at all confluent, 2″–4″ in diameter, the lower one sometimes subtended by a short filiform bract; perigynia orbicular or very broadly ovate, broadly wing-margined, about 1½″ in diameter, little if at all longer than wide, spreading or ascending, several-nerved on both faces, the roughish beak about one-third the length of the body; scales lanceolate or ovate-lanceolate, acute or obtusish, about as long as and narrower than the perigynia; stigmas 2.

In dry or moist soil, New Brunswick to Minnesota, south to Florida and Kansas. May–July.

202. Carex alàta Torr. Broad-winged Sedge. (Fig. 872.)

Carex alata Torr. Ann. Lyc. N. Y. 3: 396. 1836.
Carex straminea var. *alata* Bailey, Carex Cat. 1884.

Culms stiff, rather stout, strictly erect, roughish above, 1°–3½° tall. Leaves grass-like, but somewhat rigid, 1″–2″ wide, shorter than the culm, spikes oblong or oblong-conic, green-brown, very densely many-flowered, 5″–8″ long, 4″–5″ thick, usually conspicuously staminate and contracted at the base, pointed or obtuse at the summit, all distinct but usually little separated, bractless, or the lower one subtended by a short filiform bract; perigynia orbicular or obovate-orbicular, very broadly winged, 2″–2½″ in diameter, faintly few-nerved or almost nerveless, erect and appressed, or somewhat curved upward, the short beak not more than one-fourth as long as the body; scales lanceolate, acuminate, scarcely over ¼″ wide, a little shorter than the perigynia; stigmas 2; achene distinctly stipitate.

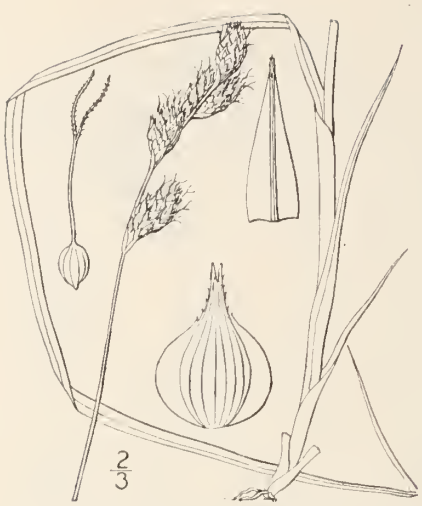
In moist soil, Massachusetts to Florida, mostly near the coast. May–June.

203. Carex albolutéscens Schwein. Greenish-white Sedge. (Fig. 873.)

Carex albolutescens Schwein. Ann. Lyc. N. Y. 1: 66. 1824.
Carex straminea var. *foenea* Torr. Ann. Lyc. N. Y. 3: 395. 1836. Not *C. foenea* Willd. 1809.
Carex albolutescens var. *cumulata* Bailey, Bull. Torr. Club, 20: 422. 1893.

Similar to the preceding species, but usually lower, culms 1°–2° tall, stout, strictly erect, rough above. Leaves 1″–2″ wide, shorter than the culm; bracts filiform or wanting, the lower one sometimes exceeding its spike; spikes 3–8, oblong, usually narrowed at both ends, staminate below, silvery green when young but becoming brownish, 4″–6″ long, mostly less than 3″ thick, clustered, but distinct, the lowest sometimes separated, and very rarely stalked; perigynia broadly ovate, not twice as long as wide, broadly winged, strongly nerved on both faces, appressed, about 2″ long, the roughish beak about one-third as long as the body; scales lanceolate, acuminate, about as long as the perigynia, but much narrower; achene nearly or quite sessile; stigmas 2.

In wet soil, most abundant along salt meadows, but also occurring inland, New Brunswick to eastern Pennsylvania and Florida. May–July.



204. Carex Bicknéllii Britton. Bicknell's Sedge. (Fig. 874.)

Carex straminea var. *Crawei* Boott, Ill. 121. *pl. 388.* 1862. Not *C. Crawei* Dewey. 1846.

Culms loosely tufted, 2°–3½° high, erect or the top inclined, rough above, much longer than the leaves. Leaves mostly nearly basal, 6′–12′ long, 1½″–2½″ wide; bracts usually very short; spikes 3–7, ovoid, subglobose, or somewhat obovoid, 4″–6″ long, close together or the lower separated, silvery green or becoming yellowish, staminate at the base; perigynia very broadly ovate, thin, several-nerved on the outer face, 2″–3″ long, the broad membranous wing ½″ wide, the rough 2-toothed beak one-fourth to one-half as long as the body; achene stalked.

In dry soil, southern New York to Minnesota and Missouri. June–July.

205. Carex sychnocéphala Carey. Dense Long-beaked Sedge. (Fig. 875.)

C. sychnocephala Carey, Am. Journ. Sci. (II.) 4: 24. 1847.

Culms erect, rather stout, quite smooth, 3′–18′ high. Leaves about 1″ wide, shorter than the culm; lower bracts similar to the leaves, much elongated, 3′–12′ long, about 1″ wide at the base, nearly erect; spikes 4–10, green-brown, oblong, densely many-flowered, staminate at the base, aggregated and confluent into an oblong or ovoid head 1′ or less long; perigynia narrowly linear-lanceolate 2½″–3″ long, about ½″ wide at the base, tapering into a subulate rough 2-toothed beak 2–3 times as long as the slightly margined and few-nerved body; scales linear-lanceolate, long-acuminate, hyaline, shorter and rather narrower than the perigynia; stigmas 2.

In meadows and thickets, Ontario and central New York to Manitoba, Minnesota and British Columbia. July–Aug.

Family 9. **ARÀCEAE** Neck. Act. Acad. Theod. Palat. 2: 462. 1770.*

ARUM FAMILY.

Herbs with basal long-petioled simple or compound leaves, and spathaceous inflorescence, the spathe enclosing or subtending a spadix. Rootstock tuberous or a corm, in our species mostly with an acrid or pungent sap. Spadix very densely flowered, the staminate flowers above, the pistillate below, or the plants wholly dioecious, or with perfect flowers in some species. Perianth wanting, or of 4–6 scale-like segments. Stamens 4–10 in our species; filaments very short; anthers 2-celled, commonly with a thick truncate connective, the sacs opening by dorsal pores or slits. Ovary 1–several-celled; ovules 1–several in each cell; style short or wanting; stigma terminal, mostly minute and sessile. Fruit a berry or utricle. Seeds various. Endosperm copious, sparse or none.

About 105 genera and 900 species, mostly of tropical regions, a few in the temperate zones.

Flowers without a perianth.	
Flowers monoecious or dioecious, borne at the base of the spadix.	1. *Arisaema.*
Flowers monoecious, covering the whole spadix.	2. *Peltandra.*
Flowers perfect.	3. *Calla.*
Flowers with a perianth.	
Spadix enclosed in a shell-like fleshy spathe.	4. *Spathyema.*
Spadix naked, terminating the scape.	5. *Orontium.*
Spadix naked, borne at the base of a leaf-like spathe.	6. *Acorus.*

*Text contributed by the late REV. THOMAS MORONG.

1. ARISAÈMA Mart. Flora, 14: 459. 1831.

Perennial herbs with acrid corms, simple scapes and 1 to 3 slender-petioled divided leaves unfolding with the flowers. Spadix included or exserted, bearing the flowers near its base. Spathe convolute, open or contracted at the throat. Flowers dioecious or monoecious, without any perianth, the staminate of 4 almost sessile 2–4-celled anthers which open by confluent slits at the apex, the pistillate with an ovoid or globose 1-celled ovary containing 1 or many orthotropous ovules; style very short or none, tipped with a peltate-capitate stigma. Fruit a globose red berry, the clusters usually large and conspicuous when ripe. Seeds with copious endosperm and an axial embryo. [Greek, in reference to the red-blotched leaves of some species.]

About 50 species, mostly natives of temperate and subtropical Asia. Besides the following, another occurs in the mountains of North Carolina.

Spathe hooded, open at the throat, enclosing the spadix. 1. *A. triphyllum.*
Spathe convolute; summit of the spadix exserted. 2. *A. Dracontium.*

1. Arisaema triphýllum (L.) Torr. Jack-in-the-pulpit. Indian Turnip. (Fig. 876.)

Arum triphyllum L. Sp. Pl. 965. 1753.
Arisaema atrorubens Blume, Rumphia, 1: 97. 1835.
Arisaema triphyllum Torr. Fl. N. Y. 2: 239. 1843.

Leaves 1 or 2, nearly erect, 10′–3° high, usually exceeding the scape, 3-foliolate, the segments ovate, entire, or sometimes lobed, acute rounded or narrowed at the base, 3′–7′ long, 1½′–3½′ wide, sessile or very short-stalked; flowers commonly dioecious, yellow, borne on the basal part of the spadix; spadix 2′–3′ long, its naked summit blunt, colored; spathe green, and purple-striped, curving in a broad flap over the top of the spadix, acuminate; filaments very short and thick; ovaries crowded; ovules 5 or 6; berries smooth, shining, about 5″ in diameter, forming a dense ovoid head 1′–3′ long.

In moist woods and thickets, Nova Scotia to Florida, west to Ontario, Minnesota, Kansas and Louisiana. Ascends to 5000 ft. in North Carolina. April–June. Fruit ripe June–July. The acrid bulb made edible by boiling.

2. Arisaema Dracóntium (L.) Schott. Green Dragon. Dragon-root. (Fig. 877.)

Arum Dracontium L. Sp. Pl. 964. 1753.
Arisaema Dracontium Schott, Melet. 1: 17. 1832.

Corms clustered. Leaves usually solitary, 8′–4° long, pedately divided into 5–17 segments, much longer than the scape; segments obovate or oblong, 3′–10′ long, 9″–4′ wide, abruptly acute at the apex, narrowed to a sessile or nearly sessile base, entire or the lateral ones somewhat lobed; scape sheathed by membranous scales at the base; spathe greenish or whitish, narrowly convolute, acuminate, 1′–2′ long, enwrapping the spadix, the upper part of which tapers into a slender appendage exserted 1′–7′ beyond its apex; inflorescence of the staminate plant nearly as long as the tubular part of the spathe; in the monoecious plant the pistillate flowers are borne on the lower part of the spadix; ovary turbinate, with 6–8 bottle-shaped ovules; stigmas depressed; berries reddish-orange in large ovoid heads.

Mostly in wet woods and along streams, but sometimes in dry soil, Maine to Ontario and Minnesota, south to Florida, Kansas and Texas. May–June.

2. PELTÁNDRA Raf. Journ. Phys. 89: 103. 1819.

Bog herbs, with entire sagittate acute or acuminate leaves, the long petioles sheathing the shorter scape at the base. Spathe elongated, convolute, or expanded above. Flowers monoecious, covering the whole spadix. Perianth none. Staminate flowers uppermost, consisting at first of irregularly 4-sided oblong flat-topped shields, from the edges of which appear 6–10 imbedded anthers opening by apical pores, the shields ultimately shrivelling and leaving the linear-oblong anthers nearly free. Ovaries ovoid, surrounded at base by 4 or 5 white fleshy scale-like staminodia, 1-celled; ovules solitary or few, amphitropous; style erect, short, thick, tipped with a small stigma. Fruit a green or red berry, 1–3-seeded, when ripe forming large globose heads at the extremity of the finally recurved scape, and enclosed in the persistent leathery base of the spathe. Seeds surrounded by a tenacious jelly; endosperm none. [Greek, referring to the shield-shaped staminate disks.]

The genus consists of the two following species:

Spathe narrow, convolute its whole length, green. 1. *P. Virginica.*
Spathe with a whitish dilated summit. 2. *P. sagittaefolia.*

1. Peltandra Virginica (L.) Kunth. Green Arrow-arum. (Fig. 878.)

Arum Virginicum L. Sp. Pl. 966. 1753.

Peltandra undulata Raf. Journ. Phys. 89: 103. 1819.

Peltandra Virginica Kunth, Enum. 3: 43. 1841.

Leaves bright green, somewhat hastate-sagittate, 4′–30′ long, 3′–8′ wide, acute or acuminate at the apex, firm, strongly veined. Root a tuft of thick fibres; scape nearly as long as the leaves, recurving and immersing the fruiting spadix at maturity; spathe green, 4′–8′ long, long-conic, closely investing the spadix throughout, the strongly involute margins undulate; spadix shorter than the spathe, the pistillate flowers covering about one-fourth of its length, the rest occupied by staminate flowers; ovaries globose-ovoid; style nearly ½″ long; stigma a little thicker than the style; berries green when ripe.

In swamps, or shallow water, Maine and Ontario to Michigan, south to Florida and Louisiana. May–June.

2. Peltandra sagittaefòlia (Michx.) Morong. White Arrow-arum. (Fig. 879.)

Calla sagittaefolia Michx. Fl. Bor. Am. 2: 187. 1803.

Peltandra alba Raf. New Fl. N. A. 1: 88. 1836.

Xanthosoma sagittaefolia Chapm. Fl. S. States, 441. 1860. Not Schott.

Peltandra sagittaefolia Morong, Mem. Torr. Club, 5: 102. 1894.

Leaves sagittate, sometimes wider than those of the preceding species, acuminate or acute, the basal lobes diverging, obtuse or subacute; petioles 8′–20′ long, equalling or longer than the scape; spathe 3′–4′ long, with a whitish expanded acuminate apex; spadix scarcely more than one-half as long as the spathe, the staminate flowers borne on its upper half; ovaries ovoid; style scarcely any; stigma broad, depressed, lobed; ripe berries red.

In marshes and springs, southern Virginia (according to Gray) to Florida. May–July.

3. CÁLLA L. Sp. Pl. 968. 1753.

A bog herb with slender acrid rootstocks, broadly ovate or nearly orbicular cordate leaves, and a large white persistent spathe. Spathe ovate-lanceolate or elliptic, acuminate, open. Spadix cylindric, much shorter than the spathe, densely covered with flowers. Flowers perfect or the very uppermost staminate; perianth none. Stamens about 6; filaments linear, longer than the anthers; anther-sacs divaricate, opening by slits. Ovary ovoid, 1-celled; style very short; stigma small, flat, circular. Ovules 6–9, anatropous. Berries obconic, depressed. Seeds hard, smooth, oblong, striate toward the micropyle and pitted at the other end. Endosperm copious. [An ancient name, taken from Pliny.]

A monotypic genus of the cooler portions of the north temperate zone.

1. Calla palústris L. Water Arum. (Fig. 880.)

Calla palustris L. Sp. Pl. 968. 1753.

Petioles 4′–8′ long, spreading or ascending. Blades thick, entire, 1½′–4′ wide, cuspidate or abruptly acute at the apex, deeply cordate at the base; scape as long as the petioles, sheathed at the base; rootstocks covered with sheathing scales and with fibrous roots at the nodes; spathe 1′–2½′ long and about 1′ wide, with an abruptly acuminate involute apex; spadix about 1′ long; berries red, distinct, few-seeded, forming a large head when mature.

In bogs, Nova Scotia to Minnesota, south to Virginia, Wisconsin and Iowa. Also in Europe and Asia. May–June. Fruit ripe July–Aug.

4. SPATHYÈMA Raf. Med. Rep. (II.) 5: 352. 1808.

[SYMPLOCARPUS Salisb.; Nutt. Gen. 1: 105. 1818.]

A fetid herb, with large ovate cordate leaves, thick straight rootstocks and a short erect partly underground scape. Spathe swollen, shell-like, thick, pointed, completely enclosing the spadix. Spadix globose or oblong, short-stalked, entirely covered by the perfect flowers. Perianth of 4 hooded sepals. Filaments slightly dilated; anthers 2-celled, short, extrorse, opening longitudinally. Ovary nearly buried in the tissue of the spadix, 1-celled with a solitary suspended anatropous ovule. Style pyramidal, 4-sided, thick, elongated; stigma minute. Berries immersed in the spongy axis of the spadix, becoming adnate to the succulent perianth in ripening, 1-seeded, forming large heads. Seeds large. Embryo large, fleshy; endosperm none. [Greek, referring to the spathe.]

A monotypic genus of eastern North America and northeastern Asia.

1. Spathyema foètida (L.) Raf. Skunk Cabbage. (Fig. 881.)

Dracontium foetidum L. Sp. Pl. 967. 1753.
Spathyema foetida Raf. Med. Rep. (II.) 5: 352. 1808
Symplocarpus foetidus Nutt. Gen. 1: 106. 1818.

Leaves numerous, in large crowns, 1°–3° long, often 1° wide, strongly nerved, abruptly acute at the apex, thin, entire, their petioles deeply channeled. Rootstock thick, descending, terminating in whorls of fleshy fibers; spathe preceding the leaves, erect, 3′–6′ high, 1′–3′ in diameter at the base, convolute, firm; purple-brown to greenish yellow, often mottled, its short scape usually subterranean, spadix about 1′ in diameter in flower, greatly enlarging and sometimes 6′ in diameter in fruit; mature seeds 4″–6″ long.

In swamps and wet soil, Nova Scotia to Ontario and Minnesota, south to Florida and Iowa. Feb.–April. Fruit ripe Aug.–Sept.

5. ORÓNTIUM L. Sp. Pl. 324. 1753.

Aquatic herbs, with thick rootstocks buried in the mud, oblong-elliptic nerved leaves without a distinct midvein, and slender terete scapes terminated by a cylindric spadix. Spathe enclosing the spadix when very young, soon parting and remaining as a sheathing bract at its base, or falling away. Flowers perfect, bright yellow, covering the whole spadix. Sepals 4–6, scale-like, imbricated upon the ovary (lower flowers commonly with 6, upper with 4). Stamens as many as the sepals; filaments linear, wider than the anthers, abruptly narrowed above; anthers small, with two diverging sacs opening by oblique slits. Ovary partly imbedded in the axis of the spadix, depressed, obtusely angled, 1-celled; ovule solitary, half-anatropous; stigma sessile. Fruit a green utricle. Endosperm none; embryo long-stalked. [Ancient name of some water plant, said to be from the Syrian river Orontes.]

A monotypic genus of eastern North America.

1. Orontium aquáticum L. Golden-club. (Fig. 882.)

Orontium aquaticum L. Sp. Pl. 324. 1753.

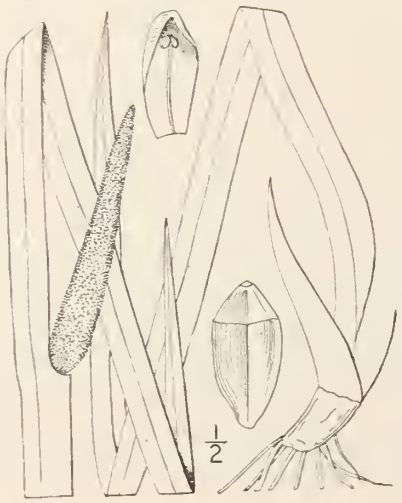
Leaves ascending or floating, depending on the depth of water, deep dull green above, pale beneath, the blade 5′–12′ long, 2′–5′ wide, entire, acute or cuspidate at the apex, narrowed at the base into a petiole 4′–20′ long. Scape 6′–24′ long, flattened near the spadix; spadix 1′–2′ long, 3″–4″ in diameter, frequently attenuate at the summit, much thickened in fruit; spathe bract-like, 2′–4′ long, 2-keeled on the back; usually falling away early; utricle depressed, roughened on top with 9 or 10 tubercles.

In swamps and ponds, Massachusetts to central Pennsylvania, south to Florida and Louisiana, mostly near the coast. Ascends to 2000 ft. on the Pocono plateau of Pennsylvania. April–May.

6. ÁCORUS L. Sp. Pl. 324. 1753.

Erect herbs, with very long horizontal branched rootstocks, sword-shaped leaves, and 3-angled scapes keeled on the back and channeled in front, and a seemingly lateral cylindric spadix, the scape appearing as if extending long beyond it, but this upper part is in reality a spathe. Flowers perfect, densely covering the whole spadix. Perianth of 6 membranous concave sepals. Stamens 6; filaments flattened, much longer than the anthers; anthers reniform or sagittate, 2-celled, the cells confluent at maturity. Ovary oblong, 3–4-celled with 2–8 anatropous ovules in each cell; stigma sessile, depressed-capitate. Fruit a 2–3-celled gelatinous berry, few-seeded. Endosperm copious. [Name ancient.]

Two known species, the following widely distributed in the north temperate zone, the other Japanese.



1. Acorus Cálamus L. Sweet Flag. Calamus-root. (Fig. 883.)

Acorus Calamus L. Sp. Pl. 324. 1753.

Leaves linear, erect, 2°–6° tall and 1′ wide or less, sharp-pointed and sharp-edged, with a ridged midvein running their whole length, 2-ranked, closely sheathing each other and the scape below. Spathe a leaf-like extension of the scape projecting 8′–30′ beyond the spadix; spadix spike-like, 2′–3½′ long, about ½′ in diameter, compactly covered with minute greenish-yellow flowers.

In swamps and along streams, Nova Scotia to Ontario and Minnesota, south to Louisiana and Kansas. Also in Europe and Asia. In our territory fruit is rarely, if ever, formed. The hard ovary is usually found to be imperfect, with 2 or 3 abortive cells and ovules. The plant is propagated by its large rootstocks, which furnish the drug Calamus. Interior of stalk sweet. May–July.

Family 10. LEMNÀCEAE Dumort. Fl. Belg. 147. 1827.*

DUCKWEED FAMILY.

Minute perennial floating aquatic plants, without leaves or with only very rudimentary ones. The plant body consists of a disc-shaped elongated or irregular thallus, which is loosely cellular, densely chlorophyllous and sometimes bears one or more rootlets. The vegetative growth is by lateral branching, the branches being but slightly connected by slender stalks and soon separating. In the autumn these disconnected branches fall to the bottom of the ditch or pond, but rise and again increase in size in the spring. The inflorescence consists of one or more naked monoecious flowers borne on a slight lateral prominence on the edge or upper surface of the plant. Each flower commonly consists of but a single stamen or a single flask-shaped pistil. The anther is provided with two to four pollen-sacs, containing spherical minutely barbellate grains. The pistil is gradually narrowed to the funnel-shaped scar-like stigmatic apex, and produces 1–6 erect or inverted ovules. The fruit is a 1–6-seeded utricle.

The family comprises the smallest of the flowering plants and contains 3 genera, all of which are represented in North America, and about 26 species of wide distribution.

Thallus prominently nerved; with a membranous spathe and a cluster of several rootlets; ovules 2 — 1. *Spirodela.*

Thallus slightly nerved; with a membranous spathe and a single rootlet; ovules 1–6. — 2. *Lemna.*

Thallus nerveless; without spathe or rootlets; ovule 1. — 3. *Wolffia.*

1. SPIRODÈLA Schleid. Linnaea, 13: 391. 1839.

Thallus disc-shaped, 7–12-nerved. The lateral branches subtended by a single bipartite basilar rudimentary leaf. The thinly-capped rootlets as well as the nerves are provided with a single bundle of vascular tissue. The ovary produces two anatropous ovules. Fruit unknown. [Greek, in allusion to the cluster of rootlets.]

Two species, the following, and *S. oligorhiza*, a native of southern Asia, Australia and the Fiji Islands.

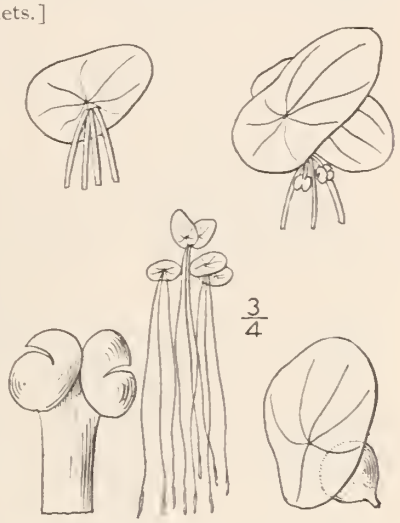
1. Spirodela polyrhìza (L.) Schleid. Greater Duckweed. (Fig. 884.)

Lemna polyrhiza L. Sp. Pl. 970. 1753.

Spirodela polyrhiza Schleid. Linnaea, 13: 392. 1839.

Thallus round-obovate, 2″–5″ long, thick, flat and dark green above, slightly convex and purple beneath, palmately 5–11-nerved. Each thallus bears a central cluster of from 5–11 elongated rootlets. Rootcap pointed.

In rivers, ponds, pools and shallow lakes, Nova Scotia to British Columbia, south to South Carolina, Texas, northern Mexico and Nevada. Widely distributed in the Old World and in tropical America. Seldom collected in flower.



2. LÉMNA L. Sp. Pl. 970. 1753.

Thallus disc-shaped, usually provided with a central nerve and with or without two or four lateral nerves. Each thallus produces a single rootlet, which is devoid of vascular tissue and is commonly provided with a thin blunt or pointed rootcap. The ovary contains from one to six orthotropous amphitropous or anatropous ovules. Fruit ovoid, more or less ribbed. Endosperm in one or three layers. [Greek, in allusion to the growth of these small plants in swamps.]

Seven species, in temperate and tropical regions. Besides the following species, *Lemna Angolensis* is a native of Lower Guinea and *Lemna paucicostata* has been found in Asia, Africa and South America.

Ovule 1, amphitropous or orthotropous; endosperm in three layers.

Thalli of two kinds, ovule amphitropous. — 1. *L. trisulca.*

Thalli all alike.

Thallus without lateral nerves; ovule orthotropous. — 2. *L. Valdiviana.*

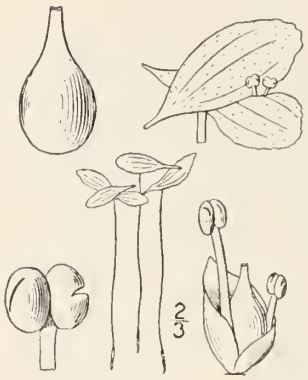
Thallus with lateral nerves; ovule orthotropous. — 3. *L. perpusilla.*

Thallus with lateral nerves; ovule amphitropous. — 4. *L. minor.*

Ovules 2–6, anatropous; endosperm in one layer. — 5. *L. gibba.*

* Text contributed by Mr. EDMUND P. SHELDON.

1. Lemna trisúlca L. Ivy-leaved Duckweed. Star Duckweed. (Fig. 885.)

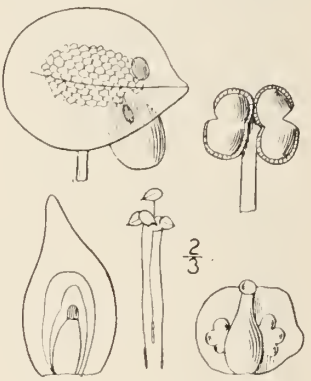


Lemna trisulca L. Sp. Pl. 970. 1753.

Thallus lanceolate, submerged and devoid of stomata in the primary aquatic form, ovate to oblong-lanceolate, 6″–9″ long, floating and provided with stomata in the later flowering stage. The later and more common form is narrowed at the base to a slender stipe, thin, denticulate, with or without rootlets, and slightly 3-nerved. Several individuals often remain connected, so as to form a chain-like series. Rootcap pointed; fruit symmetrical; seed deeply 12–15-ribbed.

In ditches, springs, ponds, shallow lakes and sloughs, Nova Scotia to the Pacific Ocean, south to New Jersey and New Mexico. Also in Europe, Asia, Africa and Australia. July–August.

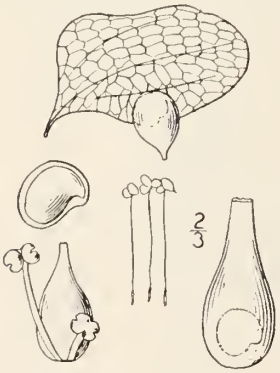
2. Lemna Valdiviàna Philippi. Valdivia Duckweed. (Fig. 886.)



Lemna Valdiviana Philippi, Linnaea, 33: 239. 1864.

Thallus oblong-elliptical, 1″–1½″ long, thin, subfalcate and shortly stalked at the base, provided with numerous stomata, except on the borders, nerveless; rootcap short and blunt; spathe reniform; fruit ovoid-oblong, unsymmetrical; seed prominently 20-ribbed.

In pools and rivers, southern New York and New Jersey and southward, west to California, Arizona and New Mexico. Also in South America. June–July.



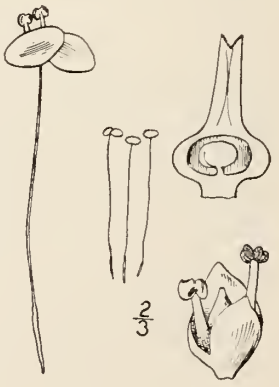
3. Lemna perpusílla Torr. Minute Duckweed. (Fig. 887.)

Lemna perpusilla Torr. Fl. N. Y. 2: 245. 1843.

Thallus small, 1″–1½″ long, obovate, often purplish tinged beneath, unsymmetrical and abruptly narrowed to a very short stalk, provided throughout with numerous stomata, more or less 3-nerved; rootcap pointed; fruit ovoid; seed 40–60-ribbed.

In ponds, rivers, springs and lakes, New York and New Jersey to Minnesota, Nebraska and Missouri. June–July.

4. Lemna mìnor L. Lesser Duckweed. (Fig. 888.)

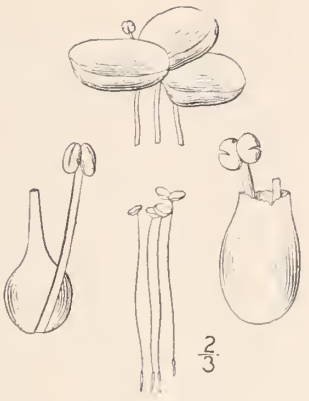


Lemna minor L. Sp. Pl. 970. 1753.

Thallus obovate or subcircular, 1″–3″ long, thickish, rarely reddish or purplish tinged, short-stalked when young, provided throughout with stomata, obscurely 3-nerved, very rarely 4–5-nerved. Rootcap obtuse or subtruncate. Fruit symmetrical, subturbinate. Seed with a prominent protruding hilum, deeply and unequally 12–15-ribbed.

In ponds, lakes and stagnant waters, throughout North America below 58° N. lat. Also in Europe, Asia, Africa and Australia. Summer.

5. Lemna gíbba L. Gibbous Duckweed. (Fig. 889.)



Lemna gibba L. Sp. Pl. 970. 1753.

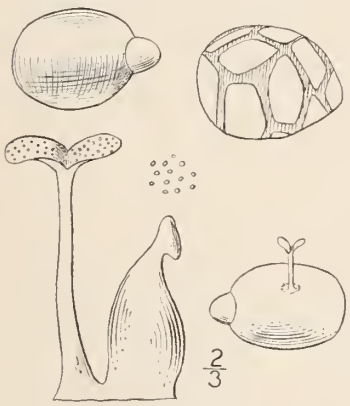
Thallus slightly unsymmetrical, obovate or short-obovate, 1½″–3″ long, thickish or more or less strongly gibbous beneath, short-stalked when young, soon separating, provided with stomata which are sparse beneath, obscurely 3–5-nerved; rootcap mostly short-pointed, rarely long-pointed or obtuse; fruit symmetrical; seed thick, deeply and unequally ribbed.

In ponds and rivers, Nebraska, Texas, Arizona and California. Also in Mexico, Europe, Asia, Africa and Australia. June–July.

3. WÒLFFIA Horkel; Schleid. Linnaea, 13: 389. 1839.

Thallus small, globose, ovoid-oblong, subcylindric or irregular, rootless, nerveless and leafless. The vegetative growth is from a cleft near one end of the plant, the branch being mostly sessile and soon detached. The ovary contains one orthotropous ovule. Fruit spherical or short ovate, smooth. Endosperm in a single layer. [Name in honor of Nath. Matth. v. Wolff, 1724–1784, Polish physician and naturalist.]

A genus of 12 species, mostly in tropical and subtropical regions. The following and two Mexican species, *W. lingulata* and *W. gladiata*, comprise all the known North American forms.



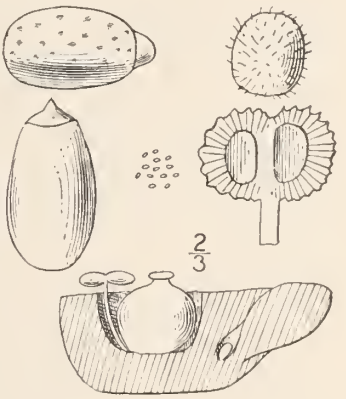
1. Wolffia Columbiàna Karst. Columbia Wolffia. (Fig. 890.)

Wolffia Columbiana Karst. Bot. Unters. 1: 103. 1865-67.

Thallus spherical or subellipsoidal ⅓″–⅔″ long, with a limited number of stomata (1 to 6), loosely cellular and clear green throughout, not dotted nor gibbous.

Floating as minute alga-like grains just beneath the surface of the water in stagnant ponds, pools and shallow lakes, Ontario to Connecticut and New Jersey, west to Minnesota and Missouri, south to Louisiana. Also in Mexico and South America. June–July.

2. Wolffia Brasiliénsis Wedd. Brazil Wolffia. (Fig. 891.)



Wolffia Brasiliensis Wedd. Ann. Sci. Nat. (III.) 12: 170. 1849.

Thallus oblong, smaller than the last, ¼″–⅓″ long, flattish, densely cellular, with numerous stomata and dark green above, gibbous, more loosely cellular, with fewer stomata and paler beneath; brown-dotted throughout with minute pigment cells.

Floating on the surface of stagnant waters, Ontario, Connecticut to New Jersey, west to Minnesota and Missouri, south to Louisiana. Also in Brazil. June–July.

Family 11. MAYACÀCEAE Walp. Ann. 3: 662. 1853.

MAYACA FAMILY.

Slender branching aquatic moss-like herbs, with linear sessile 1-nerved entire soft leaves, notched at the apex. Flowers solitary, peduncled, white, perfect, and regular, the peduncles bracted at the base. Perianth persistent, consisting of 3 lanceolate green herbaceous sepals and 3 obovate white spreading petals. Stamens 3, hypogynous, alternate with the petals; filaments filiform; anthers

oblong, somewhat 4-sided, 2-celled. Ovary superior, sessile, 1-celled with 3 parietal placentae; ovules several or numerous, orthotropous; style filiform; stigmas terminal, entire or with 3 short lobes. Capsule 1-celled, 3-valved. Seeds ovoid or globose, the testa reticulated; embryo at the apex of the mealy endosperm.

The family consists of the following genus:

1. MAYÀCA Aubl. Pl. Guian. 1: 42. 1775.

Characters of the family. [Aboriginal name of these plants in Guiana.]

About 7 species are known, all natives of warm and tropical America. Only the following occurs in the United States.

1. Mayaca Aublèti Michx. Mayaca. (Fig. 892.)

Mayaca Aubleti Michx. Fl. Bor. Am. 1: 26. 1803.
Mayaca Michauxii Schott & Endl. Melet. 1: 24. 1832.

Stems tufted, 3′–15′ long, usually little branched. Leaves densely clothing the stem and widely speading, linear-lanceolate, translucent, 2″–3″ long, about ¼″ wide; peduncles 2″–6″ long, very slender, recurved in fruit; flowers 3″–4″ broad, axillary, but borne near the ends of branches, lateral, rarely more than one on each branch; capsule oblong-oval, about as long as the sepals, tipped until dehiscence by the subulate style.

In fresh water pools and streams, southeastern Virginia to Florida and Texas. May–July.

Family 12. XYRIDÀCEAE Lindl. Nat. Syst. Ed. 2, 388. 1836.

YELLOW-EYED GRASS FAMILY.

Perennial or annual tufted herbs with basal narrow equitant commonly 2-ranked leaves, and erect simple leafless scapes. Flowers perfect, mostly yellow, nearly or quite regular, solitary and sessile in the axils of coriaceous imbricated bracts (scales), forming terminal ovoid globose or cylindric heads. Sepals 3, the two lateral ones small, keeled, persistent, the other one larger, membranous (wanting in the South American genus *Abolboda*). Corolla inferior, with a narrow tube and 3 spreading lobes. Stamens 3, inserted on the corolla, usually alternating with as many plumose or bearded staminodia. Ovary sessile, 1-celled or incompletely 3-celled; ovules numerous or few, on 3 parietal placentae, orthotropous; style terminal (unappendaged in *Xyris*, in *Abolboda* appendaged at the base), 3-branched above; stigmas apical. Fruit an oblong 3-valved capsule. Seed-coat longitudinally striate. Embryo apical. Endosperm mealy or somewhat fleshy.

Two genera, *Xyris* L. and *Abolboda* H. & B., comprising some 60 species, mostly of tropical distribution in both the Old World and the New.

1. XÝRIS L. Sp. Pl. 42. 1753.

Characters of the family as given above. [Greek name for some plant with 2-edged leaves.]

Besides the following species there are some 9 others in the southern United States.

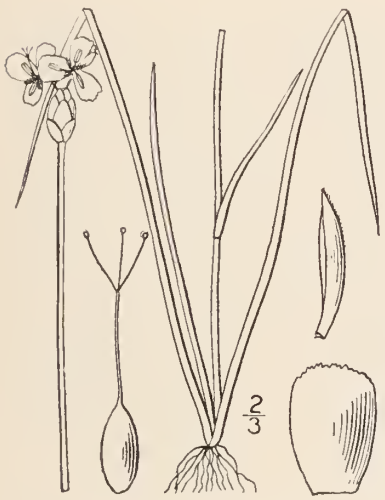
Lateral sepals wingless, the keel fringed with short hairs. 1. *X. flexuosa.*
Lateral sepals winged, the keel fimbriate or lacerate.
  Scapes not bulbous-thickened at the base; leaves flat or but slightly twisted.
    Lateral sepals about as long as the bracts, their keels lacerate.
      Head oblong, 1½″–3″ long; northern. 2. *X. montana.*
      Head oval or ovoid, 3″–8″ long; southern.
        Keel of lateral sepals lacerate to below the middle. 3. *X. communis.*
        Keel of lacerate sepals lacerate only above the middle. 4. *X. Caroliniana.*
    Lateral sepals longer than the bracts, their keels long-fimbriate. 5. *X. fimbriata.*
  Scapes conspicuously bulbous-thickened at the base; leaves spirally twisted. 6. *X. torta.*

1. Xyris flexuòsa Muhl. Slender Yellow-eyed Grass. (Fig. 893.)

Xyris flexuosa Muhl. Cat. 5. 1813.

Scapes slender, straight or sometimes slightly twisted, 4′–18′ tall, 2-edged above, bulbous-thickened at the base. Leaves narrowly linear, flat or becoming twisted when old, 1′–6′ long, ½″–1½″ wide; head globose, or short-oblong, obtuse, 3″–4″ high; bracts broadly oval or slightly obovate, entire or somewhat lacerate at the apex; lateral sepals linear, about as long as the bracts, curved, finely fringed with short hairs on the wingless keel; expanded flowers 3″–4″ broad.

In swamps and bogs, Maine to Minnesota, south to Georgia and Texas. July–Sept.



2. Xyris montàna H. Ries. Northern Yellow-eyed Grass. (Fig. 894.)

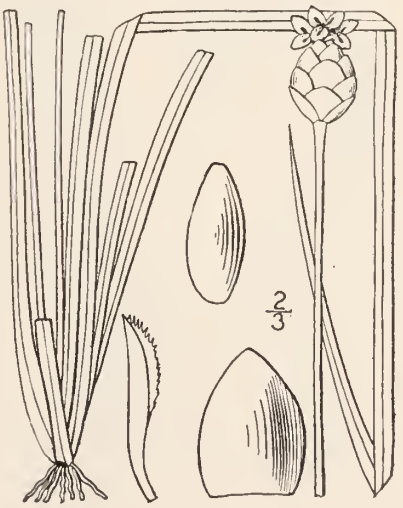
Xyris flexuosa var. *pusilla* A. Gray, Man. Ed. 5, 548. 1867. Not *X. pusilla* R. Br. 1810.

Xyris montana H. Ries, Bull. Torr. Club, 19: 38. 1892.

Scapes very slender, straight or slightly twisted, 2-edged above, 2′–12′ tall, not bulbous-thickened at the base. Leaves narrowly linear, 1′–6′ long, ½″–1″ wide, not at all twisted or but very slightly so; head oblong or ovoid, subacute, 1½″–3″ long; bracts oval or obovate, rounded and finely lacerate at the apex; lateral sepals linear, irregularly serrate-fimbriate on the winged keel above the middle, about as long as the bracts.

In bogs, Nova Scotia to Ontario and Michigan, south to the Pocono Mountains of Pennsylvania and to New Jersey. Our only species occurring on mountains. July–Aug.

3. Xyris commùnis Kunth. Southern Yellow-eyed Grass. (Fig. 895.)



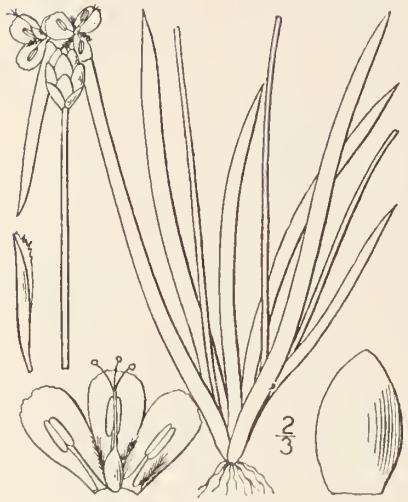
Xyris communis Kunth, Enum. 4: 12. 1843.

Xyris difformis Chapm. Fl. S. States, 500. 1860.

Scapes slender, slightly twisted, 2-edged above, 1-edged below, not thickened at the base, 6′–18′ tall. Leaves linear or linear-lanceolate, flat, 3′–10′ long, 1″–4″ wide; head ovoid, or subglobose, blunt or subacute, about ½′ long; scales ovate or oval, mostly entire; lateral sepals lanceolate, the winged keel fimbriate from the apex to below the middle; corolla-lobes obovate, 2″–3″ long.

In bogs, Maryland to Florida and Louisiana. Widely distributed in tropical America. June–Aug.

4. Xyris Caroliniàna Walt. Carolina Yellow-eyed Grass. (Fig. 896.)



Xyris Caroliniana Walt. Fl. Car. 69. 1788.

Xyris Jupacai Michx. Fl. Bor. Am. 1: 23. 1803.

Xyris elata Chapm. Fl. S. States, 501. 1860.

Scapes mostly slender, straight or somewhat twisted, 2 edged above, 1°–2° tall, not thickened at the base. Leaves linear or linear-lanceolate, flat, 4′–15′ long, 1″–5″ wide, head globose, ovoid or broadly oval, blunt, 4″–8″ long; scales oval or slightly obovate, entire or somewhat lacerate; lateral sepals linear, about as long as the bracts, the narrowly winged keel lacerate or incised-serrate only above the middle.

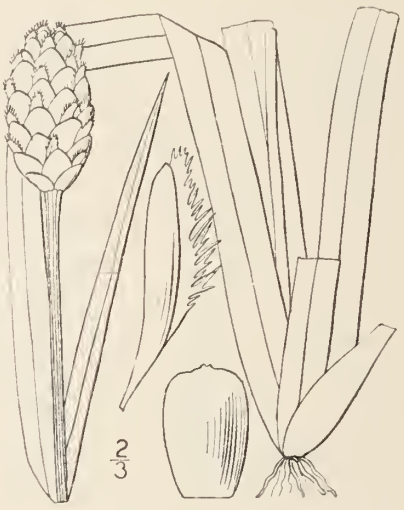
In swamps and bogs, Massachusetts to Pennsylvania, Florida and Louisiana, mostly near the coast. Young states of this plant may be mistaken for *X. montana*. June–Aug.

5. Xyris fimbriàta Ell. Fringed Yellow-eyed Grass. (Fig. 897.)

Xyris fimbriata Ell. Bot. S. C. & Ga. 1: 52. 1816.

Scapes rather stout, roughish, straight or somewhat twisted, strongly 2-edged above, 2°–4° high. Leaves flat, one-half as long as the scapes or more, 3″–6″ wide; head oblong-cylindric, ½′–1′ long or sometimes globose-ovoid and about ½′ in diameter; scales obovate, their margins entire or the apex lacerate; lateral sepals longer than the bracts, exserted, long-fringed on the winged keel above the middle.

In wet pine barrens, southern New Jersey to Florida and Mississippi, mostly near the coast. July–Sept.



6. Xyris tórta J. E. Smith. Twisted Yellow-eyed Grass. (Fig. 898.)

Xyris torta J. E. Smith in Rees' Cycl. 1819.

Scapes stout, much spirally twisted, 1-edged below, or 2-edged at the summit, smooth or very nearly so, the base conspicuously bulbous-thickened and with the sheathing leaves sometimes 1′ in diameter. Leaves narrowly linear from a broad shining nearly black base, rigid, rather shorter than the scapes, spirally twisted (very markedly so when old); head oblong or oblong-cylindric, acute or subacute, ½′–1′ long; bracts oblong-obovate, minutely lacerate-serrulate at the apex or entire; lateral sepals linear, exserted, the winged keel fringed with rather short processes above the middle.

In dry pine barrens, southern New Jersey to Florida, west to Texas, mostly near the coast, extending north to Arkansas (according to Watson and Coulter). May–Aug.

Family 13. ERIOCAULÀCEAE Lindl. Veg. Kingd. 122. 1847.*

PIPEWORT FAMILY.

Bog or aquatic herbs, perennial or perhaps sometimes annual, with fibrous mostly knotted or spongy roots, tufted grass-like basal leaves, and monoecious (androgynous) occasionally dioecious very small flowers, in terminal solitary heads, on long slender scapes. Head of flowers involucrate by bracts, each flower borne in the axil of a scarious scale. Perianth of 2 series of segments or rarely of one series. Stamens in the staminate flowers as many or twice as many as the sepals. Ovary 2–3-celled. Ovules 2 or 3. Fruit a 2–3-celled, 2–3-seeded capsule, loculicidally dehiscent. Seeds pendulous, orthotropous; endosperm farinaceous.

Six genera and about 340 species, widely distributed in warm and tropical regions, a few extending into the temperate zones. The family is most abundantly represented in South America.

Perianth of 2 series of segments; sepals and petals 2 or 3; stamens distinct; anthers 2-celled.
Stamens twice as many as the inner perianth-segments (petals). 1. *Eriocaulon.*
Stamens as many as the inner perianth-segments. 2. *Dupatya.*
Perianth simple, of 3 segments (sepals); stamens 3, monadelphous below; anthers 1-celled. 3. *Lachnocaulon.*

1. ERIOCAÙLON L. Sp. Pl. 87. 1753.

Acaulescent or very short stemmed herbs, the scapes erect, or when immersed delicate, angular, with a long sheathing bract at the base. Leaves mostly short, spreading, acuminate, parallel-nerved. Head of flowers woolly, white, lead-colored or nearly black. Staminate flowers: Outer perianth-segments 2 or 3, distinct or sometimes connate, the inner united below into a tube, alternate with the outer ones, each with a minute spot or gland near its middle or apex; stamens mostly 4-6, one opposite each perianth-segment, the filaments of those opposite the inner segments the longer; pistil small, rudimentary or none. Pistillate flowers: Outer perianth-segments as in the staminate flowers, the inner indistinct, narrow; stamens wanting; ovary sessile or stalked; style columnar or filiform, stigmas 2 or 3 filiform. Fruit a thin-walled capsule. Seeds oval, covered with minute processes. [Greek, in allusion to the wool at the base of the scape in some species.]

About 110 species, of very wide geographic distribution in tropical and warm regions. Besides the following, 3 others occur in the southern United States, and 3 in Mexico.

Leaf-blades as long as the sheaths, coarsely 3–8-fenestrate-nerved; scapes 7-angled; heads 2″–3″ in diameter. 1. *E. septangulare.*
Leaf-blades shorter than the sheaths, finely 6–20-fenestrate-nerved; scapes 10–12-angled, heads 3″–6″ in diameter. 2. *E. compressum.*
Leaf-blades much longer than the sheaths, finely 10–50-nerved; scapes 10–14-angled; heads 4″–8″ in diameter. 3. *E. decangulare.*

1. Eriocaulon septangulàre With. Seven-angled Pipewort. (Fig. 899.)

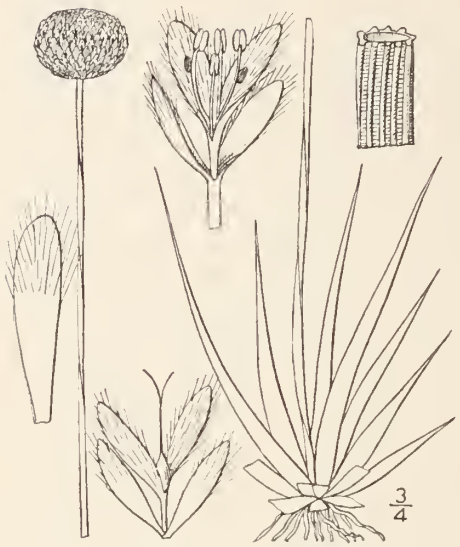
Eriocaulon septangulare With. Bot. Arr. Brit. Pl. 784. 1776.
Nasmythia articulata Huds. Fl. Angl. Ed. 2, 415. 1778.
Eriocaulon articulatum Morong, Bull. Torr. Club. 18: 353. 1891.

Stem a mere crown. Leaf-blades pellucid, 3-8-fenestrate-nerved, ½′–3′ long, usually as long as the sheaths; scapes weak, twisted, about 7-angled, smooth, 1′–8′ tall, or when submersed sometimes 4°–10° long; involucral bracts glabrous, or the innermost bearded at the apex, oblong, usually shorter than the flowers; marginal flowers usually staminate; scales of the receptacle spatulate or obovate, abruptly pointed, brown above, white-woolly; staminate flowers about 1¼″ high; pistillate flowers scarcely more than half as large; perianth-segments of both kinds of flowers white-bearded.

In still water or on shores, Newfoundland to Ontario and Minnesota, south to Florida and Texas. Also in western Europe. July–Oct.

*Text contributed by the late Rev. THOMAS MORONG.

2. Eriocaulon compréssum Lam. Flattened Pipewort. (Fig. 900.)



Eriocaulon compressum Lam. Encycl. 3: 276. 1789.

Eriocaulon gnaphalodes Michx. Fl. Bor. Am. 2: 165. 1803.

Leaf-blades 6–20-fenestrate-nerved, usually shorter than the sheaths and tapering to a long sharp point, rigid, or when submersed thin and pellucid. Stem a mere crown; scapes 6′–3° tall; smooth, flattened when dry, 10–12-angled; involucral bracts rounded, obtuse, scarious, shining, smooth, imbricated in 3 or 4 series; heads 3″–6″ in diameter, frequently dioecious; receptacle glabrous; flowers 1½″–2″ high, otherwise similar to those of the preceding species.

In still shallow water, southern New Jersey to Florida and Texas. Also in Cuba. At flowering time the styles and stigmas are much exserted, standing above the heads like projecting threads. May-Oct.

3. Eriocaulon decangulàre L. Ten-angled Pipewort. (Fig. 901.)

Eriocaulon decangulare L. Sp. Pl. 87. 1753.

Stems short and thick, 1′–2′ long. Leaf-blades finely many-nerved, tapering to a blunt point, 6′–20′ long, 2″–8″ wide, usually much longer than the sheaths; scapes stout, rigid, glabrous, 10–14-angled, 1°–3° tall; heads 4″–8″ in diameter; involucral bracts ovate, often eroded, denticulate at the apex and pubescent below, imbricated in 4 or 5 series; receptacle pubescent with many-celled hairs; flowers 2″ high, densely woolly at the base; scales longer than the flowers, acute, white-bearded; as are the spatulate perianth-segments.

In swamps, southern New Jersey and Pennsylvania to Florida and Texas. Also in Cuba. June–Oct.

2. DUPÀTYA Vell. Fl. Flum. 35. 1825.

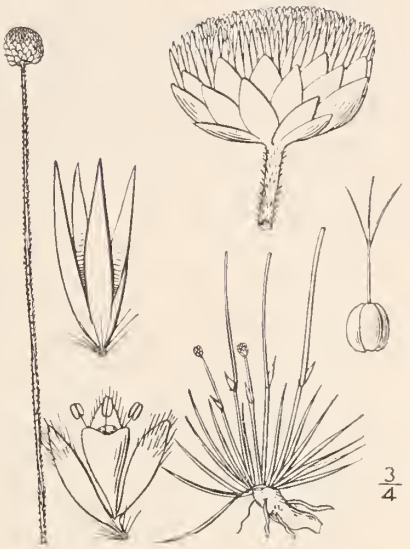
[PAEPALANTHUS Mart. Nov. Act. Leop. 17: Part 1, 10. 1830.]

Perennial or rarely annual herbs, our species with the habit of *Eriocaulon*. Stems very short. Leaves awl-shaped, tufted. Scapes slender, several-angled, erect, twisted in growth, sheathed at the base by a long acute bract. Flowers androgynous, in globular or hemispheric heads, each in the axil of a scale or the scales sometimes obsolete. Involucral bracts imbricated in 3 or 4 series. Perianth of 2 series, each of 2 or 3 segments in the staminate flowers, the outer segments distinct, the inner connate; stamens 2 or 3, inserted on the inner perianth and opposite its lobes. Pistillate flowers with the outer segments distinct, the inner often connate above the 2-celled, 2–3-ovuled ovary; style cleft into 2 or 3 entire or 2-cleft stigmas. Fruit a 2–3-celled, 2–3-seeded capsule, loculicidally dehiscent. [Name in honor of *Dupaty*.]

About 215 species, mostly natives of tropical America. Only the following is known in the United States.

1. Dupatya flavídula (Michx.) Kuntze. Dupatya. (Fig. 902.)

Eriocaulon flavidulum Fl. Bor. Am. 2: 166. 1803.
Paepalanthus flavidulus Kunth, Enum. 3: 532. 1841.
Dupatya flavidula Kuntze, Rev. Gen. Pl. 745. 1891.



Leaves 3–5-nerved, 1′–2′ long, awl-shaped, woolly at the base, glabrous or sparingly pubescent above. Scapes numerous, 5-angled, pubescent, 4′–12′ high; sheaths longer than the leaves, slightly inflated above, pubescent; involucral bracts straw-colored, glabrous, obtuse, oval, shining, somewhat pubescent at the base; receptacles glabrous or slightly pubescent; scales very thin, scarious-white, linear, slightly pubescent, about as long as the flowers; flowers about 1¼″ high; perianth 6-parted; outer perianth of the staminate flowers stalked, woolly, the inner a campanulate tube with 3 stamens; pistillate flowers with both sets of perianth-segments distinct, the inner much narrower than the outer; style 3-parted; stigmas 3.

In moist pine barrens, southern Virginia to Florida. March–July.

3. LACHNOCÀULON Kunth, Enum. 3: 497. 1841.

Tufted herbs with the habit of *Eriocaulon*, the leaves linear. Scape several-angled, sheathed at the base by an entire bract about as long as the leaves; heads globose. Receptacle pilose. Flowers androgynous. Perianth of 3 segments. Staminate flowers with 3 stamens united below into a thickened tube which is coalescent with a body, variously regarded as a corolla or as a rudimentary pistil, bearing at its apex 3 fimbriate or entire lobes alternate with the filaments; anthers 1-celled, minute. Pistillate flowers with a sessile 3-celled, 3-ovuled ovary surrounded by copious woolly hairs at the base; styles united below, spreading above into 3 divisions which are 2-parted, there being thus 6 stigmas. [Greek, referring to the woolly scapes of some species.]

Four known species, natives of the southern United States.

1. Lachnocaulon ánceps (Walt.) Morong. Hairy Pipewort. (Fig. 903.)

Eriocaulon anceps Walt. Fl. Car. 83. 1788.
Lachnocaulon Michauxii Kunth, Enum. 3: 497. 1841.
Lachnocaulon anceps Morong, Bull. Torr. Club, 18: 360. 1891.

Leaves glabrous or sparingly pubescent, 1′–3′ long, tapering to an obtuse callous point. Scapes slender, 2′–20′ tall, 2–4-angled, clothed with long soft appressed upwardly pointed hairs; sheaths equalling or shorter than the leaves; heads globose, 1″–3″ in diameter; involucral bracts ovate or oblong, shorter than the flowers, usually brown; flowers about 1″ high; scales brown, spatulate, surrounded at the base by the yellowish silky hairs of the receptacle and white-bearded at the apex; perianth of the staminate flowers short-stalked, pubescent at the base, woolly and fimbriate at the summit; segments of the pistillate perianth white, glabrous, obtuse; ovary densely villous around the base; seeds strongly ribbed.

In moist pine barrens, Virginia to Florida. The white pistillate flowers mingled with the brown staminate ones impart a mixed gray and dark appearance to the heads. March–June.

Family 14. **BROMELIÀCEAE** J. St. Hil. Expos. Fam. 1: 122. 1805.

PINE-APPLE FAMILY.

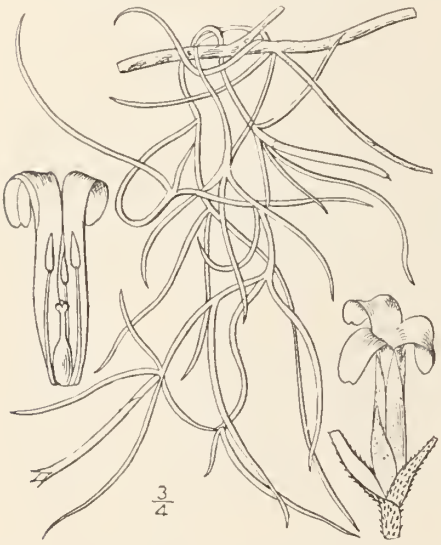
Epiphytic herbs (some tropical species terrestrial), mostly scurfy, with elongated entire or spinulose-serrate leaves. Flowers spiked, panicled, or solitary, regular and perfect, usually conspicuously bracted. Perianth of 3 thin distinct or somewhat united sepals, and 3 clawed distinct or united petals. Stamens 6, usually inserted on the base of the corolla. Ovary inferior or superior, 3-celled; ovules numerous in each cell, anatropous; style short or elongated; stigmas 3. Capsule 3-valved in our species. Seeds numerous, the testa membranous. Embryo small, situated at the base of the copious endosperm.

About 35 genera and 900 species, all natives of tropical and subtropical America.

1. TILLÁNDSIA L. Sp. Pl. 286. 1753.

Epiphytic plants of various habit, with narrow entire leaves and white, yellow or purple flowers. Sepals distinct and separate or very nearly so. Petals distinct. Stamens hypogynous or the three inner ones inserted on the bases of the petals; filaments filiform; anthers linear or linear-oblong. Ovary superior; style subulate; stigmas short. Capsule septicidally 3-valved. Seeds erect, narrow, supported on a long funiculus which splits up into fine threads. [Dedicated to Elias Tillands, Swedish (?) botanist of the seventeenth century.]

About 350 species, natives of warm and tropical America. Besides the following some 9 others occur in the southern United States.



1. Tillandsia usneoides L. Long Moss. Florida Moss. (Fig. 904.)

Renealmia usneoides L. Sp. Pl. 287. 1753.
Tillandsia usneoides L. Sp. Pl. Ed. 2, 411. 1762.

Stems very slender, thread-like, flexuous, hanging clustered in festoons from the branches of trees, 3°–20° long, gray and, like the filiform leaves, densely silvery-scurfy all over. Leaves scattered, 1′–3′ long, scarcely ½″ thick, their bases somewhat dilated; flowers sessile and solitary or rarely 2 together in the axils of the leaves; sepals about 3″ long, pale green; petals yellow, the blade about 2″ long; stamens about as long as the calyx; capsule linear, 9″–15″ long, at length splitting into 3 linear valves.

Eastern Virginia to Florida, west to Texas and Mexico. Very widely distributed in tropical America.

Family 15. **COMMELINÀCEAE** Reichenb. Consp. 57. 1828.

SPIDERWORT FAMILY.

Perennial or annual leafy herbs with regular or irregular perfect and often showy flowers in cymes, commonly subtended by spathe-like or leafy bracts. Perianth of 2 series; a calyx of mostly 3 persistent sepals, and a corolla of mostly 3 membranous and deciduous or fugacious petals. Stamens mostly 6, hypogynous, rarely fewer, all similar and perfect or 2 or 3 of them different from the others and sterile; filaments filiform or somewhat flattened; anthers 2-celled, mostly longitudinally dehiscent. Ovary superior, sessile or very nearly so, 2–3-celled; ovules 1 or several in each cell, anatropous or half anatropous; style simple; stigmas terminal, entire or obscurely 2–3-lobed. Seeds solitary or several in each cell of the capsule. Capsule 2–3-celled, loculicidally 2–3-valved. Embryo small. Endosperm copious.

About 25 genera and 350 species, mostly natives of tropical regions, a few in the temperate zones.

Perfect stamens 3, rarely 2; petals unequal; bracts spathe-like. 1. *Commelina*.
Perfect stamens 6, rarely 5; petals all alike; bracts leafy. 2. *Tradescantia*.

1. COMMELÌNA L. Sp. Pl. 40. 1753.

Erect ascending or procumbent, somewhat succulent, branching herbs, with short-petioled or sessile leaves, and irregular mostly blue flowers in sessile cymes subtended by spathe-like bracts. Sepals somewhat unequal, the larger ones sometimes slightly united. Petals blue, unequal, 2 of them larger than the third. Perfect stamens 3, rarely 2, one of them incurved and its anther commonly larger. Sterile stamens usually 3, smaller, their anthers various. Filaments all glabrous. Capsule 3-celled. Seeds 1 or 2 in each cavity, the testa firm, roughened, smooth or reticulated. [Dedicated to Kaspar Commelin, 1667–1731, Dutch botanist.]

About 95 species of wide distribution in warm and temperate regions. Besides the following, some 3 others occur in the southern United States.

Ventral cavities of the ovary 2-ovuled, the dorsal 1-ovuled.
- Capsule 3-celled, commonly 5-seeded.
  - Creeping, glabrous or nearly so; margins of the spathe not united. 1. *C. nudiflora.*
  - Stout, erect, the sheaths bearded; margins of the spathe united. 2. *C. hirtella.*
- Capsule 2-celled, 4-seeded. 3. *C. communis.*

All 3 cavities of the ovary only 1-ovuled.
- Cavities of the capsule all dehiscent. 4. *C. erecta.*
- Dorsal cavity of the capsule indehiscent. 5. *C. Virginica.*

1. Commelina nudiflòra L. Creeping Day-flower. (Fig. 905.)

Commelina nudiflora L. Sp. Pl. 41. 1753.
Commelina communis Walt. Fl. Car. 68. 1788. Not L. 1753.
Commelina agraria Kunth. Enum. 4: 38. 1843.

Glabrous or very nearly so throughout, stems procumbent or creeping, rooting at the nodes, 1°–2½° long. Leaves lanceolate or ovate-lanceolate, 1′–3′ long, 4″–8″ wide, acute or acuminate at the apex, their sheaths sometimes ciliate; spathe acute or acuminate, 8″–12″ long, peduncled, the 2 bracts not united by their margins; flowers few in each spathe, 3″–6″ broad; ventral cells of the ovary 2-ovuled, the dorsal 1-ovuled; capsule commonly 5-seeded (2 seeds in each of the ventral cells, 1 in the dorsal); seeds oblong, reticulated, about 1″ long.

Along streams and in waste places, New Jersey to Indiana and Missouri, south to Florida, Texas and through tropical America to Paraguay. Widely distributed in Asia and Africa. July–Oct.

2. Commelina hirtélla Vahl. Bearded Day-flower. (Fig. 906.)

Commelina longifolia Michx. Fl. Bor. Am. 1: 23. 1803. Not Lam. 1791.
Commelina hirtella Vahl. Enum. 2: 166. 1806.
Commelina erecta A. Gray, Man. Ed. 2. 486. 1856. Not L. 1753.

Stem stout, erect or ascending, 2°–4° high. Leaves lanceolate, acuminate, roughish, 4′–7′ long, 1′–1½′ wide, their sheaths ½′–1′ long, fringed with rather stiff and long brownish hairs and sometimes pubescent; spathes sessile or short-peduncled, often clustered at the summits of the stem and branches, the 2 bracts acute, united by their margins, rather strongly cross-veined; ventral cells of the ovary 2-ovuled, the other 1-ovuled; capsule 5-seeded; seeds ellipsoid, brown, somewhat more than 1″ long, smooth, minutely puberulent.

In moist soil, southern New Jersey to Missouri, south to Florida and Texas. Aug.–Oct.

3. Commelina commùnis L. Asiatic Day-flower. (Fig. 907.)

Commelina communis L. Sp. Pl. 40. 1753.
Commelina Willdenovii Kunth. Enum. 4: 37. 1843.

Glabrous or nearly so, stems ascending or decumbent, rather slender, sometimes rooting at the nodes, 1°–3° long. Leaves lanceolate or oblong-lanceolate, 3′–5′ long, 1′–1½′ wide, acuminate at the apex, narrowed or rounded at the base, smooth; sheath white-membranous with green veins, sometimes ciliate, 8″–12″ long; spathes few, peduncled, their 2 bracts acute or acuminate, nearly 1′ long, glabrous or sometimes pubescent, distinct; flowers deep blue, ½′ or more broad; ventral cells of the ovary 2-ovuled, the dorsal 1-ovuled; capsule 2-celled, each cell 2-seeded; seeds compressed, dark brown, roughened.

Southern New York and eastern Pennsylvania. Adventive or naturalized from Asia. July–Oct.

4. Commelina erécta L. Slender Day-flower. (Fig. 908.)

Commelina erecta L. Sp. Pl. 41. 1753.

Somewhat pubescent or glabrous, stems commonly tufted, erect or ascending, 1°–2° tall, the roots somewhat thickened. Leaves linear-lanceolate, 3′–6′ long, 4″–1′ wide, acuminate at the apex, narrowed at the base; sheaths ½′–1′ long, often pubescent; spathes peduncled or sessile, the 2 bracts more or less pubescent, acute or acuminate, distinct, 10″–20″ long; flowers ½′ or more broad; ovary 3-celled, each cell 1-ovuled; capsule papery, all its cells dehiscent, each 1-seeded; seeds ash-colored, nearly or quite smooth, puberulent.

In moist soil, southern Pennsylvania (according to Watson), south to Florida, Texas and in tropical America. Aug.–Oct.

5. Commelina Virgínica L. Virginia Day-flower. (Fig. 909.)

Commelina Virginica L. Sp. Pl. Ed. 2, 61. 1762.

Similar to the preceding species, somewhat pubescent or glabrous, stems diffusely branched, rather stouter, 1½°–3° high. Leaves lanceolate or linear-lanceolate, 3′–5′ long, 5″–12″ wide, acuminate at the apex; sheaths inflated, often pubescent, the orifice sometimes fringed; spathes several, usually peduncled, the 2 bracts acute or acuminate, 8″–12″ long, distinct; flowers 1′ broad or less, showy; capsule 3-celled, each cell 1-seeded, the dorsal one indehiscent and roughened.

In moist soil, southern New York to Illinois and Michigan, south to Florida, Nebraska, Texas and through tropical America to Paraguay. June–Sept.

2. TRADESCÁNTIA L. Sp. Pl. 288. 1753.

Perennial, somewhat mucilaginous herbs, with simple or branched stems, mostly narrow and elongated leaves, and showy regular flowers in terminal or terminal and axillary umbels subtended by leaf-like or scarious bracts. Sepals 3, distinct, herbaceous. Petals 3, obovate, ovate or orbicular, sessile. Stamens 6, all alike and fertile, or those opposite the petals shorter; filaments bearded or glabrous. Ovary 3-celled, the cells 2-ovuled. Capsule 3-celled, loculicidally 3-valved, 3–12-seeded. [In honor of John Tradescant, gardener to Charles I, died 1638.]

About 35 species, natives of tropical and temperate America. Besides the following, some 6 others occur in the southern United States.

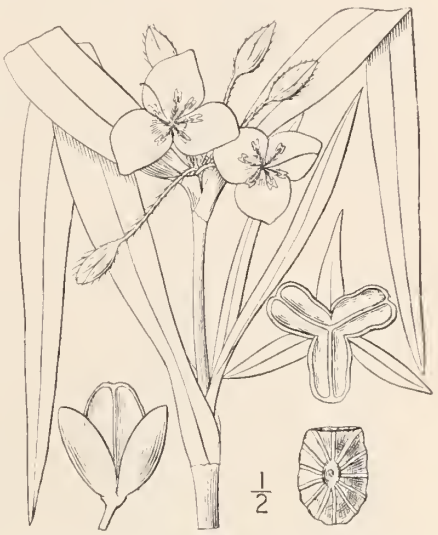
Umbel or umbels sessile, subtended by long leaf-like bracts.
- Umbels solitary or 2–4; stem straight; leaves narrow.
  - Stem glabrous or merely pubescent, 8′–2½° tall.
    - Sepals oblong-lanceolate, 4″–10″ long; flowers 1′–2′ broad. — 1. *T. Virginiana.*
    - Sepals lanceolate, 3″–4″ long; flowers less than 1′ broad. — 2. *T. montana.*
  - Whole plant long-villous; nearly or quite acaulescent. — 3. *T. brevicaulis.*
- Umbels 3–8, axillary and terminal; stem mostly flexuous; leaves broad. — 4. *T. pilosa.*

Umbel peduncled, subtended by small scarious bracts; leaves narrow. — 5. *T. rosea.*

1. Tradescantia Virginiàna L. Spiderwort. (Fig. 910.)

Tradescantia Virginiana L. Sp. Pl. 288. 1753.

Glabrous or slightly pubescent, succulent, glaucous or green, stems stout, 8′–3° tall. Leaves more or less channeled, or in some forms nearly flat, linear or linear-lanceolate, long-acuminate, often more than 1° long, 4″–1′ wide; bracts foliaceous, commonly rather wider and shorter than the leaves; umbels solitary and terminal or rarely 2–4, loosely several–many-flowered; pedicels glabrous or pubescent, slender; flowers blue or purplish, rarely white, 1′–2′ broad, very showy; sepals oblong or oblong-lanceolate, acute or obtuse, glabrous or pubescent, 4″–10″ long, much longer than the capsule.



In rich soil, mostly in woods and thickets, southern New York to Ohio and South Dakota, south to Virginia, Kentucky and Arkansas. Ascends to 4000 ft. in Virginia; variable, perhaps includes several species; May–Aug.

Tradescantia Virginiàna occidentàlis Britton.

Leaves narrowly linear, 2″–3″ wide; flowers commonly smaller. Wisconsin to Missouri, Texas and New Mexico. May be a distinct species.

2. Tradescantia montàna Shuttlw. Mountain Spiderwort. (Fig. 911.)

Tradescantia montana Shuttlw. in Distrib. Pl. Rugel.

Green and glabrous or somewhat pubescent, stems slender, simple or sparingly branched, 1°–2° tall. Leaves lanceolate or linear-lanceolate; 4′–10′ long, 2″–6″ wide, mostly distant, their sheaths enlarged; bracts similar to the leaves but shorter; umbels mostly solitary and terminal, sessile in the bracts, rather densely flowered; pedicels and calyx glabrous or pubescent; flowers less than 1′ broad; sepals lanceolate, acute, about 3″ long.

In woods and thickets, mountains of southwestern Virginia to Kentucky and Georgia. June–Aug.

3. Tradescantia brevicaùlis Raf. Short-stemmed Spiderwort. (Fig. 912.)

Tradescantia brevicaulis Raf. Atl. Journ. 150. 1832.

Tradescantia Virginica var. *villosa* S. Wats. in A. Gray, Man. Ed. 6. 539. 1890.

Villous with long spreading hairs, stems only 1′–6′ high, the plant often appearing nearly acaulescent; leaves mostly basal, 6′–12′ long, 4″–8″ wide, grass-like, linear-lanceolate, acuminate, ciliate, at least at the base, glabrous or villous toward the apex; bracts similar to the leaves, but usually more elongated; umbel 4–12-flowered, sessile in the bracts, the pedicels slender, 1′–2′ long, villous; sepals oblong; corolla about 1′ broad, blue or rose-purple.

In dry soil, Illinois, Kentucky and Missouri. April–May.

4. Tradescantia pilòsa Lehm. Zigzag Spiderwort. (Fig. 913.)

Tradescantia pilosa J. G. C. Lehm. Sem. Hort. Hamb. 16. 1827.

Tradescantia flexuosa Raf. Atl. Journ. 150. 1832.

More or less pubernlent or short-pilose, stem stout, 1°–3° high, commonly flexuous, often branched. Leaves broadly lanceolate, acuminate at the apex, mostly narrowed at the base, 6′–15′ long, ½′–2′ wide, dark green above, paler beneath; bracts usually narrower and shorter than the leaves; umbels 3–8, terminal and axillary or on short axillary branches, densely many-flowered; pedicels and calyx pubescent and more or less glandular, rarely nearly glabrous; corolla lilac-blue, 9″–15″ broad.

Southern Pennsylvania to Illinois and Missouri, south to Florida, Blooms later than *T. Virginiana*, where the two occur together. June–Aug.

5. Tradescantia ròsea Vent. Roseate Spiderwort. (Fig. 914.)

Tradescantia rosea Vent. Pl. Nouv. Jard. Cels. *pl.* 24. 1800.

Glabrous, stem very slender, erect, mostly quite simple, 6′–12′ tall. Leaves very narrowly linear, grass-like, nearly erect, channeled, 4′–7′ long, 1″–1½″ wide, clasping at the base; bracts very short and scarious; umbel terminal, long-peduncled, few-flowered, subtended by small pointed bracts; pedicels slender, short; sepals lanceolate, acute, 2″–3″ long, shorter than the petals; corolla rose-color, 6″–8″ broad; filaments hairy; style slender, long-exserted.

In dry woods, Maryland to Missouri, south to Florida and Texas. April–Aug.

Family 16. PONTEDERIÀCEAE Dumort. Anal. Fam. 59. 1829.*

PICKEREL-WEED FAMILY.

Perennial aquatic or bog plants, the leaves petioled, with thick blades, or long and grass-like. Flowers perfect, more or less irregular, solitary or spiked, subtended by leaf-like spathes. Perianth free from the ovary, corolla-like, 6-parted. Stamens 3 or 6, inserted on the tube or the base of the perianth; filaments filiform, dilated at the base or thickened at the middle; anthers 2-celled, linear-oblong or rarely ovate. Ovary 3-celled with axile placentae, or 1-celled with 3 parietal placentae; style filiform or columnar; stigma terminal, entire or minutely toothed; ovules anatropous, numerous, sometimes only 1 of them perfecting. Fruit a many-seeded capsule, or a 1-celled, 1-seeded utricle. Endosperm of the seed copious, mealy; embryo central, cylindric.

About 5 genera and 25 species, inhabiting fresh water in the warm and temperate regions of America, Asia and Africa.

Flowers 2-lipped, stamens 6; fruit a 1-seeded utricle. 1. *Pontederia.*
Flowers regular; stamens 3; fruit a many-seeded capsule. 2. *Heteranthera.*

1. PONTEDÈRIA L. Sp. Pl. 288. 1753.

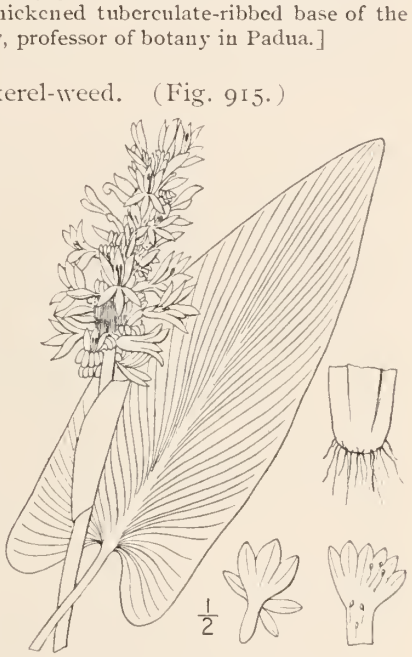
Leaves thick with many parallel veins, the petioles long, sheathing, arising from a horizontal rootstock. Stem erect, 1-leaved, with several sheathing bract-like leaves at the base. Flowers blue, ephemeral, numerous, spiked, the spike (or spadix) peduncled and subtended by a thin bract-like spathe. Perianth 2-lipped, the upper lip of 3 ovate lobes, the middle lobe longest, the lower lip of 3 linear-oblong spreading lobes. Stamens 6, borne at unequal distances upon the perianth-tube, 3 of them opposite the lower lip, the others opposite the upper lip; anthers oblong, subversatile, introrse. Ovary 3-celled, 2 of the cells abortive and empty. Fruit a 1-seeded utricle, enclosed in the thickened tuberculate-ribbed base of the perianth. [In honor of Giulio Pontedera, 1688–1757, professor of botany in Padua.]

Seven or eight species, natives of America.

1. Pontederia cordàta L. Pickerel-weed. (Fig. 915.)

Pontederia cordata L. Sp. Pl. 288. 1753.

Stem rather stout, 1°–4° tall. Leaves ovate, cordate-sagittate, 4′–8′ long, 2′–6′ wide at the base, the apex and basal lobes obtuse; basal lobes often with long narrow stipule-like appendages on the sheathing petiole; spadix and inflorescence glandular-pubescent; perianth about 4″ long, it and the filaments, anthers, and style bright blue, its tube curved, slightly longer than the lobes, middle lobe of the upper lip with 2 yellow spots at the base within; ovary oblong, tapering into the slender style; stigma minutely 3–6-toothed.



Borders of ponds and streams, Nova Scotia to Minnesota, south to Florida and Texas. After flowering the lobes and upper part of the perianth-tube wither above, while the persistent base hardens around the fruit. The flowers are trimorphous. June–Oct.

Pontederia cordàta lancifòlia (Muhl.) Morong, Mem. Torr. Club, 5: 105. 1894.

Pontederia lancifolia Muhl. Cat. 34. 1813.
Pontederia cordata var. *angustifolia* Torr. Fl. N. U. S. 1: 343. 1824.

Leaves lanceolate, rounded or narrowed at the base, 2′–10′ long, 3″–8″ wide. Ontario to New Jersey, Cuba and Texas.

2. HETERANTHÈRA R. & P. Prodr. Fl. Per. 9. 1794.

[SCHOLLERA Schreb. Gen. 785. 1789. Not Roth. 1788.]

Herbs with creeping, ascending or floating stems, the leaves petioled, with cordate, ovate, oval or reniform blades, or grass-like. Spathes 1-flowered or several-flowered. Flowers small, white, blue or yellow. Lobes of the perianth nearly or quite equal, linear. Stamens 3, equal or unequal, inserted on the throat of the perianth. Ovary fusiform, entirely or incompletely 3-celled by the intrusion of the placentae; ovules numerous; stigma 3-lobed. Fruit an ovoid many-seeded capsule, enclosed in the withered perianth-tube. Seeds ovoid, many-ribbed. [Greek, referring to the unequal anthers of some species.]

About 9 species, 2 in tropical Africa, the others American; only the following in the United States.

*Text contributed by the late Rev. THOMAS MORONG.

Leaves mostly reniform, sometimes cordate-ovate. 1. *H. reniformis.*
Leaves ovate or oval, sometimes slightly cordate. 2. *H. limosa.*
Leaves linear, grass-like, floating. 3. *H. dubia.*

1. Heteranthera renifórmis R. & P. Mud Plantain. (Fig. 916.)

Heteranthera reniformis R. & P. Fl. Per. 1: 43. 1798.

Leptanthus reniformis Michx. Fl. Bor. Am. 1: 25. 1803.

Stems creeping in the mud, rooting at the nodes. Leaves cordate or reniform, rarely cordate-ovate and acute, the blades 6″–15″ long, 8″–16″ wide; petioles sheathing, 1′–4′ long; spathe 2–5-flowered; tube of the perianth straight or slightly curved, slender, about 4″ long, its lobes shorter; flowers white or pale blue; anthers basifixed, the 2 upper oval, the other on a longer filament and linear.

In mud or shallow water, Connecticut to New Jersey, Illinois and Kansas, south to Louisiana, and in South and Central America.

2. Heteranthera limòsa (Sw.) Willd. Smaller Mud Plantain. (Fig. 917.)

Pontederia limosa Sw. Prodr. 57. 1788.

Heteranthera limosa Willd. Neue Schrift. Ges. Nat. Fr. Berlin, 3: 439. 1801.

Leptanthus ovalis Michx. Fl. Bor. Am. 1: 25. 1803.

Stems commonly much branched from the base, 6′–15′ long. Leaves numerous, oval or ovate, obtuse at the apex, rounded or slightly cordate at the base, 1′ long or less; petioles 2′–5′ long; spathes 1-flowered, often on peduncles 1′ long or more; flowers white or blue, usually larger than those of the preceding species; filaments equal or nearly so; anthers linear, often sagittate.

In mud or shallow water, Virginia to Kentucky and Missouri, south to Florida, Louisiana and throughout tropical America.

3. Heteranthera dùbia (Jacq.) MacM. Water Star-grass. (Fig. 918.)

Commelina dubia Jacq. Obs. Bot. 3: 9. *pl. 59.* 1768.
Leptanthus gramineus Michx. Fl. Bor. Am. 1: 25. 1803.
Heteranthera graminea Vahl. Enum. 2: 45. 1806.
Schollera graminea A. Gray, Man. 511. 1848.
Heteranthera dubia MacM. Met. Minn. 138. 1892.

Aquatic, stem slender, forked, often rooting at the nodes, 2°–3° long. Leaves linear, flat, elongated, acutish, finely parallel-nerved, their sheaths thin, furnished at the top with small acute stipule-like appendages; flowers light yellow, the perianth-segments narrow; stamens nearly equal; tube of the perianth 1″–1½″ long; spathe 1–2-flowered; filaments dilated below; anthers linear, 2″ long, sagittate; style shorter than the stamens; stigma several-lobed; capsule 1-celled with 3 parietal placentae, many-seeded.

In still water, Ontario to Oregon, south to Florida and Mexico. Also in Cuba. Occasionally occurs in a small form on muddy shores. July–Oct.

Family 17. JUNCÀCEAE Vent. Tabl. 2: 150. 1799.*

RUSH FAMILY.

Perennial or sometimes annual, grass-like, usually tufted herbs, commonly growing in moist places. Inflorescence usually compound or decompound, paniculate, corymbose, or umbelloid, rarely reduced to a single flower, bearing its flowers singly, or loosely clustered, or aggregated into spikes or heads. Flowers small, regular, with or without bractlets (prophylla). Perianth 6-parted, the parts glumaceous. Stamens 3 or 6, rarely 4 or 5, the anthers adnate, introrse, 2-celled, dehiscing by a slit. Pistil superior, tricarpous, 1-celled or 3-celled, with 3–many ascending anatropous ovules, and 3 filiform stigmas. Fruit a loculicidal capsule. Seeds 3–many, small, cylindric to subglobose, with loose or close seed-coat, with or without caruncular or tail-like appendages.

Seven genera and about 200 species, widely distributed.

Leaf-sheaths open; capsule 1- or 3-celled, many-seeded; placentae parietal or axial. 1. *Juncus.*
Leaf-sheaths closed; capsule 1-celled, 3-seeded, its placenta basal. 2. *Juncoides.*

1. JÚNCUS L. Sp. Pl. 325 (1753).

Usually perennial plants, principally of swamp habitat, with glabrous herbage, stems leaf-bearing or scapose, leaf-sheaths with free margins, and leaf blades terete, gladiate, grass-like, or channeled. Inflorescence paniculate or corymbose, often unilateral, sometimes congested, bearing its flowers either singly and with 2 bractlets (prophylla), or in heads and without bractlets, but each in the axil of a bract; bractlets almost always entire; stamens 6 to 3; ovary 1-celled or by the intrusion of the placentae 3-celled, the placentae correspondingly parietal or axial; seeds several–many, usually distinctly reticulated or ribbed, often tailed.

About 150 species, most abundant in the north temperate zone. The species bloom in summer. [Latin, from *jungo*, to bind, in allusion to the use of these plants for withes.]

A. Lowest leaf of the inflorescence terete, not conspicuously channeled, erect, appearing like a continuation of the stem, the inflorescence therefore appearing lateral; stem leaves none.

1. Flowers bracteolate, inserted singly on the branches of the inflorescence. GENUINI.
Perianth-parts green, or in age straw-colored.
Perianth-parts equalling or exceeding the capsule, all acute.
Stamens 3; leaf of the inflorescence much shorter than the stem.
Capsule without a distinct apical papilla. 1. *J. effusus.*
Capsule with a distinct apical papilla. 2. *J. conglomeratus.*
Stamens 6; leaf of inflorescence about equalling the stem, or longer. 3. *J. filiformis.*
Perianth-parts reaching only the middle of the capsule, inner obtuse. 4. *J. gymnocarpus.*
Perianth-parts with a chestnut-brown stripe down either side of the midrib. 5. *J. Balticus.*
2. Flowers not bracteolate, inserted in heads on the branches of the inflorescence. THALASSICI.
Perianth-parts pale brown; seed tailless. 6. *J. Roemerianus.*
Perianth-parts green, or in age straw-colored; seed tailed. 7. *J. maritimus.*

B. Lowest leaf of the inflorescence not appearing like a continuation of the stem, or if so, conspicuously channeled along the upper side, the inflorescence usually appearing terminal.

1. LEAF-BLADE TRANSVERSELY FLATTENED (INSERTED WITH ITS FLAT SURFACE FACING THE STEM), OR TERETE AND CHANNELED, NOT PROVIDED WITH SEPTA.

* Flowers bracteolate, inserted singly on the branches of the inflorescence, sometimes clustered or congested, but never in true heads. POIOPHYLLI.
Annual; inflorescence, exclusive of its leaves, more than one-third the height of the plant. 8. *J. bufonius.*
Perennial; inflorescence, excluding leaves, not one-third the height of the plant.
Leaf-blade flat, but sometimes involute in drying.
Inflorescence 1–3-flowered; leaves with fimbriate auricles. 9. *J. trifidus.*
Inflorescence, except in depauperate specimens, several–many-flowered; leaves with entire auricles.
Cauline leaves 1 or 2, rarely wanting; perianth-parts obtuse. 10. *J. Gerardi.*
Cauline leaves none; perianth parts acute or acuminate.
Inflorescence usually much exceeded by its lowest leaf; flowers seldom plainly secund; perianth 1¾″–2¾″ long, usually exceeding the capsule; capsule obovoid, broadly rounded at the apex, the placentae intruded half way to the axis. 11. *J. tenuis.*
Inflorescence rarely exceeded by its lowest leaf; flowers plainly secund on the branches; perianth 1¼″–2″ long, equalling the capsule; capsule oblong, 3-sided, truncate at the apex; placentae meeting in the axis. 12. *J. secundus.*
Leaf-blade terete, channeled along the upper side.
Lowest leaf of inflorescence not four lengths of the panicle; capsule oblong to obovoid.
Seed tailed. 13. *J. Vaseyi.*
Seed not tailed.
Perianth 1¼″–1½″ long, plainly exceeded by the capsule. 14. *J. Greenei.*
Perianth 1¾″–2″ long, not exceeded by the capsule. 15. *J. dichotomus.*
Lowest leaf of the inflorescence rarely less than four times as long as the panicle; capsule globose-ovoid. 16. *J. setaceus.*

* Text contributed by Mr. FREDERICK V. COVILLE.

** Flowers not bracteolate, in true heads on branches of the inflorescence. GRAMINIFOLII.
Stem erect; capsule oblong or obovoid, obtuse at the apex.
Stamens 3, with red-brown anthers; capsule not mucronate. 17. *J. marginatus.*
Stamens 6, with yellow anthers; capsule mucronate. 18. *J. longistylis.*
Stem creeping, floating, or ascending; capsule subulate. 19. *J. repens.*

2. LEAF-BLADE NOT TRANSVERSELY FLATTENED, COMMONLY TERETE, HOLLOW, PROVIDED WITH SEPTA.

* Leaf-blade usually channeled along the upper side; septa usually imperfect, not externally evident; inflorescence of 1–4 heads; plants of arctic or alpine range. ALPINI.
Body of the seed ½″ in length or more.
Leaf-sheath not auriculate. 20. *J. castaneus.*
Leaf-sheath auriculate. 21. *J. stygius.*
Body of the seed less than ½″ in length.
Lowest leaf of inflorescence foliose, erect; capsule deeply retuse at apex. 22. *J. biglumis.*
Lowest leaf of inflorescence membranous, spreading; capsule obtuse and mucronate at the apex. 23. *J. triglumis.*

** Leaf-blade not channeled along the upper side (except in *J. bulbosus*), the septa perfect (except in *J. polycephalus*), and usually externally evident; inflorescence, except in depauperate specimens, of several to many heads; plants not of arctic-alpine range. SEPTATI.

† Stamens 6, one opposite each perianth-part.
Heads reduced to one, or rarely two flowers. 24. *J. pelocarpus.*
Heads 2-many-flowered.
Epidermis not roughened.
Plants with two kinds of leaves, one normal, the other basal, submersed, and capillary.
Plant low, less than 10′ high. 25. *J. bulbosus.*
Plant tall, more than 10′ high. 26. *J. militaris.*
Plants without submersed capillary leaves.
Capsule oblong, either abruptly acuminate or bluntly acute.
Branches widely spreading; capsule sharply acute, tapering into a conspicuous point. 27. *J. articulatus.*
Branches usually strict; capsule broadly acute, or obtuse, with a short point. 28. *J. Richardsonianus.*
Capsule subulate.
Leaf-blades erect; inner perianth-parts longer than the outer. 29. *J. nodosus.*
Leaf-blades abruptly divergent from the stem; outer perianth-parts longer than the inner. 30. *J. Torreyi.*
Epidermis of the leaves roughened with minute tubercles. 31. *J. Caesariensis.*

†† Stamens 3, none opposite the inner perianth-parts.
Capsule less than three-fourths as long as the perianth. 32. *J. brachycarpus.*
Capsule more than three-fourths as long as the perianth.
Capsule tapering evenly into a prominent subulate beak.
Leaf-blade vertically flattened and with incomplete septa, only rarely compressed and with complete septa. 33. *J. polycephalus.*
Leaf-blade terete or nearly so, the septa complete.
Uppermost cauline leaf with a well-developed blade. 34. *J. scirpoides.*
Uppermost cauline leaf with a rudimentary blade rarely exceeding 1′ in length. 35. *J. megacephalus.*
Capsule obtuse to acute at the apex, sometimes mucronate, but not prolonged into a beak.
Seed ⅓″–1″ long.
Perianth about 1″ long, the fruiting head not more than 2″ high. 36. *J. brachycephalus.*
Perianth 1½″–2″ long, or if shorter, the fruiting head 2″ high or more. 37. *J. Canadensis.*
Seed ⅕″–¼″ long.
Perianth and mature capsule 1″–2″ long.
Perianth 1¼″–2″ long, or if less the whole plant not 20′ high. 38. *J. acuminatus.*
Perianth 1″–1¼″ long, the whole plant more than 20′ high. 39. *J. robustus.*
Perianth and mature capsules 2″–3″ long. 40. *J. diffusissimus.*

1. Juncus effūsus L. Common Rush. Bog Rush. Soft Rush. (Fig. 919.)

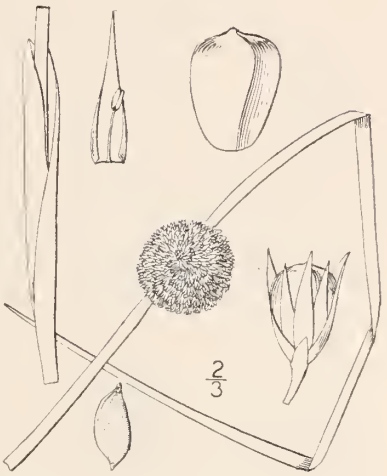
Juncus effusus L. Sp. Pl. 326. 1753.

Plant 1½°–4° high, densely tufted, erect. Rootstock stout, branching, proliferous; stem soft, merely striate beneath the inflorescence; basal leaf-blades reduced to filiform rudiments; inflorescence many-flowered, 1′–4′ high, in one form congested into a still smaller compact cluster; lowest bract of the inflorescence 2′–10′ long, much shorter than the stem; perianth 1″–1½″ long, its parts green, lanceolate, acuminate; stamens 3, the anthers shorter than the filaments; capsule obovoid, 3-celled, muticous, regularly dehiscent; seed ⅕″–¼″ in length, obliquely oblong, reticulate in about 16 longitudinal rows, the reticulations smooth and two or three times broader than long.

In swamps and moist places, nearly throughout North America, except the arid and high northern portions. Ascends to 3000 ft. in Virginia. Also in Europe and Asia.

2. Juncus conglomerâtus L. Glomerate Rush. (Fig. 920.)

Juncus conglomeratus L. Sp. Pl. 326. 1753.
Juncus Leersii Mars. Fl. Neu-Vorpom. 451. 1869.



Plant 1°–2½° high, densely tufted, erect. Rootstock stout, with proliferous branches; stem distinctly ribbed just beneath the inflorescence; leaf-blades wanting or reduced to minute filiform rudiments; inflorescence congested, seldom more than 10″ high; lowest bract of the inflorescence 2′–6′ long, much shorter than the stem; perianth 1¼″–2″ long, its parts green, lanceolate, acuminate; stamens 3, about two-thirds as long as the perianth; anthers shorter than the filaments; capsule nearly as long as the perianth, obovoid, obtuse or retuse at apex, tipped with the base of the style; seed ⅛″–¼″ in length, obliquely oblong, acute or abruptly apiculate at both ends, reticulate in about 16 longitudinal rows, the reticulations smooth and two or three times broader than long.

In the sphagnum bogs of Newfoundland. Resembling in appearance specimens of *J. effusus* with congested inflorescence. Also in northern Europe and Asia.

3. Juncus filifórmis L. Thread Rush. (Fig. 921.)

Juncus filiformis L. Sp. Pl. 326. 1753.

Perennial, stems 4′–25′ tall, erect, about ½″ in diameter, arising from a creeping rootstock; basal leaves reduced to bladeless sheaths; involucral leaf usually longer than the stem; inflorescence rarely with more than 20 flowers or more than 1′ high, commonly with less than 8 flowers and less than 10″ high; perianth 1¼″–1¾″ long, its parts nearly equal, green with hyaline margins, narrowly lanceolate, acute, or the inner obtuse; stamens 6, about half as long as the perianth; anthers shorter than the filaments; style very short; capsule obovoid, green, barely pointed, about three-fourths as long as the perianth, 3-celled; seed obliquely oblong, about ¼″ long, pointed at either end, with an irregularly wrinkled coat, seldom developing reticulations.

Labrador to British Columbia, south to the mountains of Pennsylvania, to Michigan, and in the Rocky Mountains to Utah and Colorado. Also in Europe and Asia.

4. Juncus gymnocàrpus Coville. Pennsylvania Rush. (Fig. 922.)

Juncus Smithii Engelm. Trans. St. Louis Acad. 2: 444. 1866. Not Kunth, 1841.
J. gymnocarpus Coville, Mem. Torr. Club, 5: 106. 1894.

Stems erect, 1°–2½° high, about 1″ thick, arising at intervals from a creeping proliferous rootstock about 1½″ in diameter; basal leaves reduced to bladeless clasping sheaths; panicle commonly 7″–15″ high, spreading, its subtending leaf usually 4′–10′ long; perianth 1″ in length or a little less, its parts with a green midrib, equal, lanceolate, the outer acute, the inner obtuse; stamens 6, nearly as long as the perianth, the anthers shorter than the filaments; capsule almost twice as long as the perianth, broadly ovoid, conspicuously mucronate, brown and shining, barely dehiscent, 3-celled; seed obliquely obovoid or oblong, somewhat misshapen by compression in the capsule, about ⅓″ long, none with perfect markings seen.

In swamps, mountains of Schuylkill and Lebanon counties, Pennsylvania.

5. Juncus Bàlticus Willd. Baltic Rush. (Fig. 923.)

Juncus Balticus Willd. Berlin Mag. 3: 298. 1809.

Stems erect, 8′–36′ high, ½″–1¼″ thick, arising at intervals from a stout creeping rootstock 1″–1½″ thick; basal leaves reduced to bladeless sheaths; panicle commonly 1′–2½′ high; perianth 1½″–2¼″ long, its parts lanceolate, acute, or the inner sometimes obtuse, nearly equal, brown with a green midrib and hyaline margins; style ½″–1″ long; stigmas a little shorter; stamens 6, about two-thirds the length of the perianth; anthers about ¾″ in length, much longer than the filaments; capsule about as long as the perianth, pale to dark brown, narrowly ovoid, conspicuously mucronate, 3-celled; seeds usually with a loose coat, nearly ½″ long, oblong to narrowly obovoid, oblique, about 40-striate.

On shores, Labrador to Alaska, southern New York, Ohio and Nebraska; far south in the western mountains. Also in Europe and Asia. Variable.

6. Juncus Roemerianus Scheele. Roemer's Rush. (Fig. 924.)

Juncus Roemerianus Scheele, Linnaea, 22: 348. 1849.

Stems 20′–4° tall, erect, arising singly from a tough scaly horizontal rootstock 2½″–5″ thick; inner sheaths bearing erect blades of about the same length as the stem; inflorescence 2¼′–6′ high, diffusely spreading, its leaf 4′–10′ long; heads 2–6-flowered; perianth pale brown, 1″–1¾″ long, the parts linear-oblong, the outer acuminate, the inner shorter and bluntly acute; flowers imperfectly dioecious; stamens 6, on fertile plants reduced to sterile staminodia; capsule brown, about as long as the perianth, narrowly obovoid, obtuse or truncate, mucronate, 3-celled; placenta very thick and spongy, about one-third as broad as the valve; seed dark brown, ¼″–⅜″ long, obovoid, abruptly apiculate, indistinctly reticulate or distinctly 20–26-ribbed and the intervening spaces imperfectly cross-lined.

In brackish marshes, New Jersey to Texas. Long confused by American authors with the following species.

7. Juncus marítimus Lam. Sea Rush. (Fig. 925.)

Juncus maritimus Lam. Encycl. 3: 264. 1789.

Stems 20′–40′ high, 1″–2″ thick, erect from a stout horizontal rootstock. Outer basal leaves reduced to bladeless sheaths, the innermost foliose, with a long terete stout blade about equalling the stem; leaf of the inflorescence erect, sometimes 1° long, sometimes barely exceeding the panicle; panicle 3′–8′ high, its branches stiff, erect; heads 2–6-flowered; perianth 1½″–1¾″ long, its parts green, lanceolate, with hyaline margins, the outer acuminate, the inner a little shorter; flowers perfect; stamens 6, two-thirds as long as the perianth; filaments about as long as the anthers; capsule 1½″–1¾″ long, narrowly ovoid, acute, mucronate, brown above, 3-celled, with thin placentae; seed brown, about ½″ long, the body narrowly and obliquely oblong, about ⅜″ in length, 20–30-ribbed, indistinctly reticulate, tailed at either end.

Coney Island, New York. Common on the coasts of the eastern hemisphere.

8. Juncus bufònius L. Toad Rush. (Fig. 926.)

Juncus bufonius L. Sp. Pl. 328. 1753.

Plant branching from the base, annual, erect, seldom exceeding 8′ in height, the stems in large plants with 1 or 2 leaves below the inflorescence; leaf-blade flat, ¼″–½″ wide, in low plants often much narrower and filiform-involute; inflorescence about one-half as high as the plant, with blade-bearing leaves at the lower nodes; flowers inserted singly on its branches, in one form fasciculate; perianth-parts 2″–3½″ long, lanceolate, acuminate, equal; stamens usually 6, sometimes 3, seldom half as long as the perianth; anthers shorter than the filaments; capsule about two-thirds as long as the perianth; narrowly oblong, obtuse, mucronate, 3-celled; seed broadly oblong, with straight tips, 1/16″–¼″ long, minutely reticulate in 30–40 longitudinal rows, the areolae broader than long.

A cosmopolitan species, occurring throughout North America, except the extreme north, and frequenting dried-up pools, borders of streams and roadsides in clayey soil.

9. Juncus trífidus L. Highland Rush. (Fig. 927.)

Juncus trifidus L. Sp. Pl. 326. 1753.

Densely tufted, 4′–12′ high; stems closely set on a stout rootstock, erect, about ¼″ thick; basal leaves reduced to almost bladeless sheaths, the uppermost with a rudimentary blade and fimbriate auricles; stem leaf 1, inserted near the inflorescence, with a narrower slender, flat or involute blade; inflorescence a cluster of 1–3 flowers, the lowest subtending bract similar to the stem leaf, the succeeding one much smaller or wanting; perianth dark brown, 1¼″–1¾″ long; stamens 6; anthers about as long as the filaments; capsule equalling the perianth, coriaceous, 3-celled, obovoid with a conspicuously mucronate-aristate top; seeds few, narrowly obovoid, acute at the base, irregularly angled, minutely striate both longitudinally and transversely.

Greenland and Labrador, south on the higher mountains of New England and New York to Sam's Point, N. Y. Also in northern Europe and Asia.

10. Juncus Geràrdi Lois. Black-grass. (Fig. 928.)

Juncus Gerardi Lois. Journ. de Bot. 2: 284. 1809.

Tufted, 8′–28′ high, with creeping rootstocks. Basal leaves with rather loosely clasping auriculate sheaths, the long blades flat, or when dry involute; 1 or 2 cauline leaves usually present, similar to the basal; inflorescence paniculate, sometimes exceeded by its lowest bract; panicle erect, strict or slightly spreading; perianth 1″–1¼″ long, its parts oblong, obtuse, with green midrib and broad dark brown margins, straw-colored in age; stamens 6, barely exceeded by the perianth; anthers much longer than the filaments; capsule one-fourth to one-half longer than the perianth, obovoid, mucronate, dark brown, shining, 3-celled; seed dark brown, obovate, acute at base, broadly obtuse and often depressed at the summit, marked by 12–16 conspicuous ribs, the intervening spaces cross-lined.

On salt meadows, Gulf of St. Lawrence to Florida; rare in western New York and the vicinity of the Great Lakes. Occurs also on the northwest coast, and in Europe.

11. Juncus ténuis Willd. Slender Rush. Yard Rush. (Fig. 929.)

Juncus tenuis Willd. Sp. Pl. 2: 214. 1799.

Tufted, 8′–30′ high; basal leaves with blades ¼″–¾″ wide, sometimes involute in drying, about half the height of the stem; stem leaves none; inflorescence usually much exceeded by its lowest leaf, 4′ high or less, the flowers rarely secund; perianth 1¾″–2½″ long, its parts lanceolate, acuminate, exceeding the capsule, widely divergent, touching the capsule for about half their length; stamens 6, about half as long as the perianth; anthers shorter than the filaments; capsule oblong to obovoid, rounded at the top, imperfectly 3-celled; seed ⅕″–¼″ long, narrowly oblong to obovoid, with oblique ends, reticulated in about 16 rows, the areolae two or three times broader than long.

In dry or moist soil, especially on paths, almost throughout North America, now migrating to all parts of the world. Variable.

12. Juncus secúndus Beauv. Secund Rush. (Fig. 930.)

Juncus secundus Beauv.; Poir. Encycl. Sup. 3: 160. 1813.
Juncus tenuis var. *secundus* Engelm. Trans. St. Louis Acad. 2: 450. 1866.

Tufted, 6′–16′ high; leaves usually less than one-third the height of the plant; inflorescence longer than its lowest leaf or only slightly exceeded by it, 10″–4′ high, the flowers secund on the usually somewhat incurved branches; perianth-parts 1¼″–1¾″ long, equalling or barely exceeding the capsule and appressed to it for about two-thirds their length, often reddish above; stamens 6, about one-half as long as the perianth; capsule narrowly ovoid, 3-sided above the middle with straight sides and a truncate apex, completely 3-celled, the placentae meeting in the axis; seed ⅛″–⅕″ long, narrowly oblong to ovoid, obliquely tipped, with 12–16 longitudinal rows of areolae two or three times broader than long.

In dry soil, New Jersey and Pennsylvania to North Carolina. Occasional in the middle Mississippi Valley.

13. Juncus Vàseyi Engelm. Vasey's Rush. (Fig. 931.)

Juncus Vaseyi Engelm. Trans. St. Louis Acad. 2: 448. 1866.

Stems erect, tufted, 1°–2½° high, ¾″ in diameter or less; basal leaves with minutely auriculate sheaths, the uppermost bearing a terete channeled blade half to three-fourths as long as the stem; stem leaves none; inflorescence 1⅔′ in height or less, 4–40-flowered, the lowest bract usually not exceeding the inflorescence; perianth 1½″–2″ long, the parts subulate-lanceolate, with hyaline margins, the inner slightly shorter; stamens 6, about two-thirds as long as the perianth; anthers shorter than the filaments; style almost wanting; stigmas short; capsule slightly exceeding the perianth, narrowly oblong, obtuse or truncate, with a short tip, 3-celled; seed long-tailed, with a linear-oblong oblique body about ¼″ long, 20–24-ribbed, the intervening spaces with faint transverse markings.

Maine and Ontario to Michigan, Illinois and Iowa.

14. Juncus Greènei Oakes & Tuckerm. Greene's Rush. (Fig. 932.)

Juncus Greenei Oakes & Tuckerm. Am. J. Sci. **45**: 37. 1843.

Stems erect, densely tufted, 8′–2½° high, Basal leaves with slender terete channeled blades one-half or rarely two-thirds the length of the stem; stem leaves none, or a single one below the inflorescence; panicle 10″–20″ high, rather compact, somewhat umbelloid, much exceeded by its lowest bract; perianth 1¼″–1½″ long, its parts stiff, lanceolate, sharply acute, with brownish red stripes and apex, the inner shorter; stamens 6, half to two-thirds as long as the perianth; anthers about as long as the filaments; style and stigmas very short; capsule one-fourth to one-half longer than the perianth, ovate-lanceolate in outline, truncate at the summit, 3-celled; seed obliquely oblong, ⅓″–¼″ long, slightly reticulated in about 20–24 rows, the areolae nearly square.

New Brunswick to New Jersey, near the coast; Michigan, Wisconsin, Minnesota and Ontario.

15. Juncus dichótomus Ell. Forked Rush. (Fig. 933.)

Juncus dichotomus Ell. Bot. S. C. & Ga. **1**: 406. 1817.

Closely tufted, 1°–3° high; leaves all basal except those of the inflorescence; sheaths usually reddish, the blades terete, channeled along the upper side, about one-half the height of the stem; inflorescence paniculate, subsecund, 1½′–3¾′ high, usually exceeded by its lowest bract; perianth about 2″ long, its parts subulate-lanceolate, green when young, straw-colored when old; stamens 6, about one-half as long as the perianth, the anthers shorter than the filaments; capsule slightly shorter than the perianth, oblong, obtuse, mucronate, 1-celled, the placentae intruded half way to the center; seed oblong, dark brown, obliquely apiculate, less than ¼″ long, reticulate in about 14 longitudinal rows, the smooth areolae about as long as broad.

In dry soil, Maine to Florida and Texas, near the coast.

16. Juncus setàceus Rostk. Awl-leaved Rush. (Fig. 934.)

Juncus setaceus Rostk. Monog. Junc. 13. *pl. 1. f. 2.* 1801.

Densely tufted from stout branching rootstocks. Stems terete, spreading and recurved above, 1½°–3° long; leaves all basal except those of the inflorescence, the uppermost sheath usually bearing a long terete blade similar to the stem, but channeled; the other sheaths with filiform blades less than ½′ in length; involucral leaf appearing like a continuation of the stem, 4′–1° long; inflorescence appearing lateral, 2′ long or less; perianth 1″–2½″ long, its parts lanceolate, acuminate, rigid, widely divergent in fruit; stamens 6; anthers usually longer than the filaments; capsule globose, shining, mucronate, 1-celled, with intruded placentae, barely dehiscent; seed subglobose, ¼″–⅓″ long, reticulate in about 12 longitudinal rows, the areolae large.

In marshes, Delaware to Florida and Texas, near the coast, extending north in the Mississippi Valley to Missouri.

17. Juncus marginàtus Rostk. Grass-leaved Rush. (Fig. 935.)

Juncus marginatus Rostk. Monog. Junc. 38. *pl. 2. f. 3.* 1801.
Juncus marginatus var. *paucicapitatus* Engelm. Trans. St. Louis Acad. 2: 455. 1866.

Stems erect, tufted, 6′–30′ high from branching rootstocks, somewhat bulbous at the base, compressed, 2–4-leaved. Leaf-sheaths auriculate; blades ½″–1½″ broad, 2–4 conspicuous veins in addition to the midrib; inflorescence 4′ high or less, the panicle composed of 2–20 turbinate to subspherical 5–10-flowered heads; perianth 1¼″–1¾″ long, the outer parts ovate, acute, the inner slightly longer, obovate, obtuse, with hyaline margins; stamens 3, nearly as long as the perianth; anthers ovate, reddish brown when dry, much shorter than the filaments; capsule equalling the perianth, obovoid, truncate or retuse, almost 3-celled, the placentae deeply intruded; seed oblong, ⅕″–¼″ long, pointed at either end, 12–16-ribbed.

Grassy places, Maine to Ontario, Florida and Nebraska.

Juncus marginàtus aristulàtus (Michx.) Coville, Proc. Biol. Soc. Wash. 8: 123. 1893.
Juncus aristulatus Michx. Fl. Bor. Am. 1: 192. 1803.
Juncus marginatus var. *biflorus* Wood, Classbook, Ed. 2, 725. 1861.
Taller, sometimes 3½° high; leaf-blades 1″–2½″ broad; heads usually 20–100, mostly 2–5-flowered. New York to Florida and Mexico, mostly near the coast; Mississippi Valley to Michigan.

Juncus marginàtus setòsus Coville, Proc. Biol. Soc. Wash. 8: 124. 1893.
Inner perianth-parts ovate or lanceolate, acute or acuminate; seeds smaller. Kansas to Mexico.

18. Juncus longistylis Torr. Long-styled Rush. (Fig. 936.)

Juncus longistylis Torr. Bot. Mex. Bound. 223. 1859.

Stems erect, loosely tufted, 8′–30′ high, rather stiff, slender, compressed, 1–3-leaved, the leaves mostly below the middle. Leaf blades ¾″–1½″ wide, acute, striate, the midrib well defined; inflorescence 2′ high or less, usually of 2–10 irregular 3–8-flowered heads, or reduced to a single larger one; perianth 2½″–3″ long, the parts equal, brown, lanceolate, acuminate, with hyaline margins; stamens 6, half to two-thirds as long as the perianth, the yellow linear anthers longer than the filaments; style about ½″ long; stigmas 1″–1½″ long; capsule shorter than the perianth, oblong, brown, angled above, obtuse or depressed at the summit, mucronate, 3-celled; seed oblong, white-tipped, about ¼″ long, 14–20-ribbed.

Western Nebraska and the Rocky Mountain region.

19. Juncus rèpens Michx. Creeping Rush. (Fig. 937.)

Juncus repens Michx. Fl. Bor. Am. 1: 191. 1803.

Perennial by prostrate rooting branches; stems tufted, compressed, ascending, floating or prostrate, 2′–20′ long. Leaves with compressed sheaths 10″ in length, auriculate, the blades 1′–3½′ long, ½″–1″ broad, filiform-acuminate; inflorescence of 1–8 heads, one or more heads often occurring also at the lower nodes; heads 5–10-flowered; flowers 3″–5″ long, the outermost slightly recurved; periauth-parts subulate-lanceolate, the outer keeled, about one-third shorter than the inner; stamens 3, half to one third the length of the perianth; filaments longer than the yellow anthers; capsule subulate, beakless, about as long as the outer perianth-parts, 3-celled, the valves membranous, breaking away from the axis in dehiscence; seed oblong, acute at either end, ⅐″–⅓″ long, finely reticulate in 25–40 longitudinal rows.

In swamps and streams, Delaware to Florida, Cuba and Texas, and in Lower California.

20. Juncus castàneus Smith. Chestnut Rush. Clustered Alpine Rush. (Fig. 938.)

Juncus castaneus Smith, Fl. Brit. 1: 383. 1800.

Stems erect, 4′–20′ high, terete, leafless, or with a single leaf, arising singly from a slender rootstock. Basal leaves 3–5, the outer sheaths short, loose, the inner clasping, sometimes 4′ long, not auriculate, their blades tapering from an involute-tubular base to a slender channeled acutish apex; inflorescence strict, usually exceeded by its lowest bract, the other bracts membranous and mostly equalling the flowers; heads 1–3, 3–12-flowered; pedicels ½″–1¼″ long; perianth brown or black, 2″–3½″ long, its parts lanceolate, acute; stamens nearly as long as the perianth; anthers about ½″ long; capsule brown, paler toward the base, 1½–2 times as long as the perianth, narrowly oblong, tapering to an acute summit, imperfectly 3-celled; seed 1¼″–2″ long, contracted into long slender tails, the body about ½″ long.

Newfoundland to Alaska, south along the Rocky Mountains to Colorado. In Europe and Asia.

21. Juncus stýgius L. Moor Rush. (Fig. 939.)

Juncus stygius L. Syst. Nat. Ed. 10, 2: 987. 1759.
J. stygius var. *Americanus* Bnch. in Engler, Bot. Jahrb. 12: 393. 1890.

Rootstock none; stems 3′–1° high, single, or few together, erect, 1–3-leaved below, leafless above; leaf-sheaths 5″–10″ long, clasping, nerved, auriculate; blades erect or nearly so, 10″–4′ long, slightly compressed, channeled on the upper side, tapering to a blunt point; inflorescence of 1–4 heads; heads 1–4-flowered; lowest bract usually exceeding the flowers; perianth 1½″-2½″ long, pale, its parts lanceolate, 3-nerved, equal, with membranous margins, obtuse or acute; stamens half as long as the perianth or more; anthers oblong, shorter than the filaments; capsule 3″–4″ long, pale brown, spindle-shaped, acute, mucronate, 3-celled below, few-seeded; seed spindle-shaped, 1¼″–1½″ long, with a loose coat, the body about ½″ long, narrowed into thick tails.

Newfoundland to Maine, northern New York, Michigan and Minnesota; also in British Columbia and Europe.

22. Juncus biglùmis L. Two-flowered Rush. (Fig. 940.)

Juncus biglumis L. Sp. Pl. 328. 1753.

Stems 1′–8′ high, loosely tufted on a branched rootstock, erect, nearly terete. Leaves 1–5, all basal, the outermost sheath usually 4″ long or less, the innermost sometimes much longer, inconspicuously or not at all auriculate, the blades nearly terete; inflorescence a capitate cluster of 1–4 flowers, its lowest bract erect, foliose, green with brown membranous margins below; perianth 1½″–1¾″ long, dark brown, its parts membranous, oblong, obtuse, nearly equal; stamens equalling the perianth; anthers linear-oblong; capsule longer than the perianth, cylindric-oblong, 3-sided, retuse at the summit, with 3 keeled shoulders, purplish black, or with purple-margined valves, imperfectly 3-celled; seed ½″–⅗″ long, fusiform, the body narrowed into short stout tails.

Baffin Bay to Alaska and British Columbia. Also in Europe and Asia.

23. Juncus triglùmis L. Three-flowered Rush. (Fig. 941.)

Juncus triglumis L. Sp. Pl. 328. 1753.

Stems 3′–7′ high, loosely tufted on a branched rootstock, erect, terete. Leaves 1–5, all basal, with sheaths clasping and conspicuously auriculate, the blades subterete, blunt, ¼″ in diameter, usually less than half the height of the plant; inflorescence a capitate cluster of 1–5 (usually 3) flowers, the lowest 2 or 3 bracts nearly equal, divergent, about as long as the flowers, usually brown, obtuse and membranous; perianth 1½″–2″ long, its parts oblong-lanceolate, obtuse; stamens nearly as long as the perianth; anthers linear, short; capsule about equalling the perianth, oblong, obtuse, mucronate, 3-angled, imperfectly 3-celled; seed about 1″ long, its body oblong, abruptly contracted into long slender tails.

Labrador and Newfoundland to Alaska, south in the Rocky Mountains to Colorado. Also in Europe and Asia.

24. Juncus pelocàrpus E. Meyer. Brownish-fruited Rush. (Fig. 942.)

Juncus pelocarpus E. Meyer, Syn. Luz. 30. 1823.

Rootstock slender; stems 3′–20′ high, 1–5-leaved; basal leaves 2–4, with loose auriculate sheaths, mostly with slender terete blades seldom exceeding 5′ in length; stem leaves 1–5, similar to the basal; inflorescence 4′ in height or less; secondary panicles rarely produced from the axils of the upper leaves; panicle loose, with distant heads of 1 or sometimes 2 flowers; perianth ¾″–1½″ long, the parts linear-oblong, green to reddish-green, obtuse or the inner sometimes acute, the outer usually the shorter, all of them frequently modified into rudimentary leaves; stamens 6, about two-thirds as long as the perianth; anthers slightly exceeding the filaments; style commonly ½″ and stigmas 1″ long; capsule subulate-linear, its slender beak exceeding the perianth, 1-celled; seed oblong to obovoid, ⅓″–¼″ long, reticulate in about 24 rows, the areolae smooth.

Newfoundland to New Jersey and Minnesota.

Juncus pelocàrpus subtilis (E. Meyer) Engelm. Trans. St. Louis Acad. 2: 456. 1866.

Juncus subtilis E. Meyer, Syn. Luz. 31. 1823.

Much smaller, depressed, 1–few-flowered. Northern Maine and adjacent Canada.

25. Juncus bulbòsus L. Bulbous Rush. (Fig. 943.)

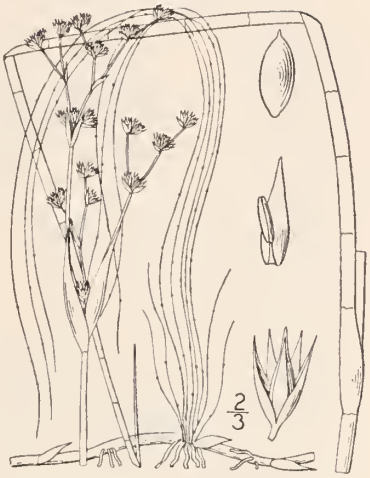
Juncus bulbosus L. Sp. Pl. 327. 1753.

Tufted, 2′–8′ high; stems erect, or procumbent and rooting at the joints, usually bulbous. Leaves of two kinds, the basal mostly submersed, filiform, the cauline stouter, all with auriculate sheaths 10″ long or less, the septa of the blades inconspicuous; panicle of 1–10 heads; heads top-shaped to hemispheric, 4–15-flowered, some of the flowers often transformed into tufts of small leaves; perianth 1⅓″–1½″ long, its parts nearly equal, linear-lanceolate, obtuse, brown, or with a green midrib; stamens 3, shorter than the perianth; anthers a little shorter than the filaments; capsule narrowly oblong, obtuse, mucronate, slightly exceeding the perianth, brown above, 1-celled; seed narrowly oblong, about ¼″ long, acute at base, obtuse and apiculate above, 25–30-ribbed.

Labrador and Newfoundland. Common in Europe.

26. Juncus militàris Bigel. Bayonet Rush. (Fig. 944.)

Juncus militaris Bigel. Fl. Bost. Ed. 2, 139. 1824.



Stems 20′–4° high, erect, stout, 1½″–3″ thick below, arising from a stout rootstock. Leaves of two kinds, the submersed borne in dense fascicles on the rootstock and developing filiform, nodose blades sometimes 20′ long; basal leaves reduced to loose bladeless sheaths, sometimes 10′ long; stem leaves 1 or 2, the lower with a long stout terete blade 1″–2″ thick at the base, the upper, when present, reduced to a bladeless sheath; inflorescence 3′–6′ high, its bracts with obsolete blades; heads top-shaped to semiglobose, 6–12-flowered; perianth 1½″–1¾″ long, its parts narrowly linear-subulate, the inner longer than the outer; stamens 6, nearly as long; anthers slightly exceeding the filaments; capsule ovoid, acuminate, beaked, 1-celled, few-seeded, about equalling perianth; seed obovoid, about ¼″ long, reticulated in about 24 rows.

Shallow margins of lakes, ponds or streams, Nova Scotia to northern New York and Maryland.

27. Juncus articulàtus L. Jointed Rush. (Fig. 945.)

Juncus articulatus L. Sp. Pl. 327. 1753.

Rootstock branching; stems erect or ascending, 8′–2° high, tufted, somewhat compressed, 2–4-leaved; basal blade-bearing leaves only 1 or 2, usually dying early; stem leaves with rather loose sheaths and conspicuously septate blades; inflorescence rarely exceeding 4′ in height, its branches spreading; heads hemispheric to top-shaped, 6–12-flowered; perianth 1″–1½″ long, the parts nearly equal, lanceolate, acuminate, reddish brown with a green midrib or green throughout; stamens 6, one-half to three-fourths as long as the perianth; anthers shorter than the filaments; capsule longer than the perianth, brown, 3-angled, sharply acute, tapering into a conspicuous tip, 1-celled; seed oblong-obovoid, about ¼″ long, reticulate in about 16–20 rows, the areolae finely cross-lined.

Labrador to Massachusetts, New York, Michigan and British Columbia. Also in Europe and Asia. On ballast ground about Philadelphia and Camden a form occurs with obtuse perianth-parts and broadly acute capsules, apparently introduced.

28. Juncus Richardsonianus Schult. Richardson's Rush. (Fig. 946.)

J. Richardsonianus Schult. in R. & S. Syst. 7: 201. 1829.
Juncus alpinus var. *insignis* Fries; Engelm. Trans. St. Louis Acad. 2: 458. 1866.

Stems erect, 6′–20′ high in loose tufts, from creeping rootstocks, 1–2-leaved; stem leaf or leaves usually borne below the middle; panicle 2½′–8′ high, sparse, its branches strict or slightly spreading; heads 3–12-flowered; perianth 1″–1¼″ long, the inner parts shorter than the outer, obtuse, usually purplish toward the apex, the three outer paler, obtuse, mucronate or acute; stamens 6, half to two-thirds as long as the perianth; anthers much shorter than the filaments; capsule ovoid-oblong, slightly exceeding the perianth, straw-color or brown, broadly acute or obtuse, with a short tip; seed about ¼″ in length, narrowly obovoid to oblong, apiculate, acute or acuminate at the base, lightly reticulate in about 20 rows, the areolae finely cross-lined.

Nova Scotia to British Columbia, south to Pennsylvania, Nebraska and Washington.

29. Juncus nodòsus L. Knotted Rush. (Fig. 947.)

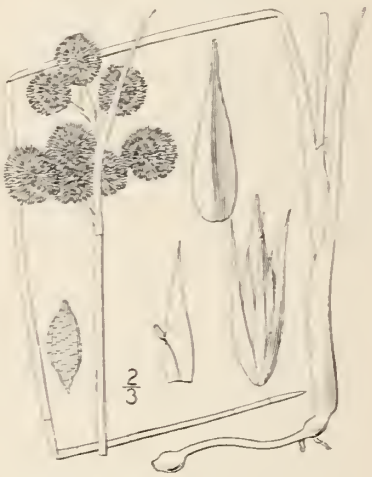
Juncus nodosus L. Sp. Pl. Ed. 2. 466. 1762.

Stems 6′–2° high, erect, arising singly from tuber-like thickenings of a slender, nearly scaleless root-stock; stem leaves 2–4, and like the basal ones with long erect blades, the upper overtopping the inflorescence; panicle shorter than its lowest bract, seldom exceeding 2¼′, bearing 1–30 heads; heads spherical, several-many-flowered, 3½″–6″ in diameter; perianth 1⅜″–1¾″ long, its parts lanceolate-subulate, usually reddish brown above, the inner longer than the outer; stamens 6, about one-half as long as the perianth; anthers equalling the filaments; capsule lanceolate-subulate, 3-sided, 1-celled, exceeding the perianth; seed oblong, acute below, apiculate above, rarely more than ⅛″ long, reticulate in 20–30 rows, the areolae finely cross-lined.

Nova Scotia to Virginia, Nebraska and British Columbia. Also in Nevada.

30. Juncus Tórreyi Coville. Torrey's Rush. (Fig. 948.)

Juncus Torreyi Coville. Bull. Torr. Club. 22. 303. 1895.
J. nodosus var. *megacephalus* Torr. Fl. N. Y. 2: 326. 1843.
Juncus megacephalus Wood. Bot. Ed. 2. 724. 1861. Not *J. megacephalus* M. A. Curtis. 1835.



Stems 8′–40′ high; rootstock slender, with tuberiform thickenings at intervals of a few centimeters, each supporting a single stem; stem stout, 1–4-leaved; blade stout, terete, 5″–1′ thick, abruptly divergent from the stem; inflorescence congested, consisting of 1–20 heads, exceeded by its lowest bract; heads 5″–8″ in diameter; perianth 2″–2½″ long, its parts subulate, the outer longer than the inner; stamens 6, about half as long as the perianth; capsule subulate, 3-sided, 1-celled, its beak ½″–¾″ long, exceeding the perianth and holding the valves together throughout dehiscence; seed ⅕″–¼″ in length, oblong, acute at both ends, reticulate in about 20 longitudinal rows, the areolae finely cross-lined.

Western New York to Texas and the Pacific Coast.

31. Juncus Caesariénsis Coville. New Jersey Rush. (Fig. 949.)

J. Caesariensis Coville. Mem. Torr. Club. 5. 106. 1894.
Juncus asper Engelm. Trans. St. Louis Acad. 2: 478. 1868. Not Sauzé. 1864.

Stems 20′–40′ high, stout, erect, 1¼″ in thickness, slightly roughened; basal leaves few, the uppermost, like the cauline, with inconspicuously articulate sheaths and long erect terete roughened blades; inflorescence 1′–4′ high, with spreading branches, its lowest bract with a small blade sometimes 1½′ long; heads 2–5-flowered; perianth 2″–2½″ long, the parts lanceolate-acuminate, stiff, green, striate, the inner longer than the outer; stamens 6, about half as long as the perianth; filaments about equalling the anthers; style and stigmas long; capsule lanceolate-oblong, 3-sided, mucronate-acuminate, incompletely 3-celled; seed tailed at both ends, altogether about 1″ long, the body about ⅜″ long, closely striate, almost devoid of transverse lines.

Sandy swamps of southern New Jersey.

32. Juncus brachycàrpus Engelm. Short-fruited Rush. (Fig. 950.)

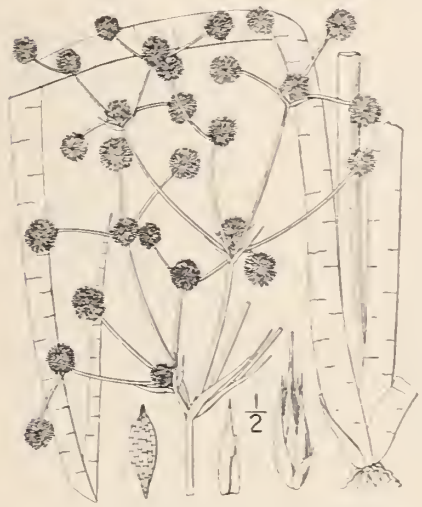
Juncus brachycarpus Engelm. Trans. St. Louis Acad. 2: 467. 1868.

Rootstocks bearing 1–6 stems; stems erect, 8′–36′ high, terete, 1–4-leaved; blades terete, 1″ thick or less, seldom exceeding 6′ in length, the upper much shorter; inflorescence sometimes 4′ high and with 20 spherical heads, or smaller and even reduced to a single head; perianth 1½″–2″ long, its parts subulate, the inner about three-fourths as long as the outer; stamens 3, about half as long as the perianth; capsule one-half to two-thirds as long as the perianth, oblong, acute, mucronate, 1-celled, dehiscent through the tip; seed oblong, acute at both ends, about ⅛″ long, reticulate in about 18 longitudinal rows, the areolae smooth and nearly square.

Southern Ontario, through the Mississippi Valley to Oklahoma, Texas and Mississippi; also from North Carolina to Maryland.

33. Juncus polycéphalus Michx. Many-headed Rush. (Fig. 951.)

Juncus polycephalus Michx. Fl. Bor. Am. 1: 192. 1803.
Juncus scirpoides var. *polycephalus* Engelm. Trans. St. Louis Acad. 2: 468. 1868.
Juncus Engelmanni Buch. Krit. Verz. Junc. 67. 1880.



Stem stout, about 3° high, compressed, 2–4-leaved. Leaves 20′ in length or less, the upper shorter; blades vertically flattened, 1½″–4″ broad, the septa incomplete, or the blades rarely narrower, merely compressed, and with complete septa; inflorescence 3½′–12′ high, its leaves with nearly obsolete blades; heads globose, 3½″–5″ in diameter; perianth 1½″–2″ long, its parts subulate; stamens 3, one-half to three-fourths as long as the perianth; anthers shorter than the filaments; capsule subulate, 1-celled, exceeding the perianth, the valves remaining united by the slender beak, their margins finally involute; seed narrowly oblong, about ¼″ long, acute at each end, with nearly straight tips, reticulate in about 12 rows, the areolae smooth.

In swamps, Virginia? to Florida and Texas.

34. Juncus scirpoides Lam. Scirpus-like Rush. (Fig. 952.)

Juncus scirpoides Lam. Encycl. Meth. Bot. 3: 267. 1789.
Juncus scirpoides var. *macrostemon* Engelm. Trans. St. Louis Acad. 2: 467. 1868.

Stems 8′–3° high, erect, terete, in clusters from short, horizontal rootstocks. Stem leaves 1–3; blades terete, 1″ thick or less, usually less than 4′ long, the septa perfect; basal leaves similar, but with longer blades; inflorescence strict or slightly spreading, sometimes 6′ in length; heads 2–30, either simple, globose, 3″–4″ in diameter in flower, and 4″–5½″ in fruit, or lobed, and of slightly greater diameter; perianth 1¼″–1¾″ long, its parts subulate, the inner somewhat shorter; stamens equalling the inner perianth-parts, the short anthers exserted at the mouth of the perianth; capsule subulate, 1-celled, its long beak exceeding the periauth; seed oblong, abruptly apiculate at either end, ¼″–¼″ long, reticulate in 14–20 longitudinal rows, the areolae smooth.

New York to Florida and Louisiana.

35. Juncus megacéphalus M. A. Curtis. Carolina Rush. (Fig. 953.)

Juncus megacephalus M. A. Curtis, Bost. Journ. Nat. Hist. 1: 132. 1835.
Juncus scirpoides var. *echinatus* Engelm. Trans. St. Louis Acad. 2: 468. 1868.

Stems 1°–3° high, tufted from a branching rootstock, stout, 2–3-leaved. Leaves with auricled sheaths, the blades of the basal 8′ long or less, those of the stem with successively shorter blades, the uppermost rarely 10″ in length; inflorescence 6′ high or less, its lowest leaf almost bladeless, the others scarious; panicle of 1–40 heads; heads spherical, 4″–6″ in diameter; perianth 1½″–1¾″ long, its parts subulate, the outer longer than the inner; stamens 3, half to two-thirds the length of the inner perianth-parts; anthers included, shorter than the filaments; capsule subulate, beaked, equalling the perianth, 3-sided, 1-celled; seed oblong, ⅓″–¼″ long, acute at either end, reticulate in 12–14 rows, the areolae smooth.

Virginia? North Carolina to Florida.

36. Juncus brachycéphalus (Engelm.) Buch. Small-headed Rush. (Fig. 954.)

Juncus brachycephalus Buch. in Engler, Bot. Jahrb. 12: 268. 1890.
Juncus Canadensis var. *brachycephalus* Engelm. Trans. St. Louis Acad. 2: 474. 1868.

Stems 1°–2½° high, tufted from a branching rootstock, erect or occasionally reclining and rooting at the nodes, 2–4-leaved; leaves all with well developed blades, the lower commonly 4′–8′ long; inflorescence commonly 2½′–6′ high, with spreading branches, its lowest bract foliose; heads top-shaped, 2–5-flowered; perianth 1″–1¼″ long, its parts green, or reddish brown above, with hyaline margins, lanceolate, obtuse or sometimes acute, the outer shorter than the inner; stamens 3; anthers much shorter than the filaments; capsule reddish brown, about one-half longer than the perianth, ovoid-oblong, acute to obtuse, tipped, 3-sided, 1-celled; seed ⅓″–½″ long, with narrowly oblong body, short-tailed at either end, 20–30 ribbed, somewhat cross-barred, the intervening spaces finely cross-lined.

New York to Pennsylvania, Illinois and Wisconsin.

37. Juncus Canadénsis J. Gay. Canada Rush. (Fig. 955.)

J. Canadensis J. Gay; Laharpe, Monog. Jonc. 134. 1825.
Juncus Canadensis longicaudatus Engelm. Trans. St. Louis Acad. 2: 474. 1868.

Stems 1°–4° high, erect, stout, 2–4-leaved, few in a tuft, from a branched rootstock. Basal leaves usually decayed at flowering-time; stem leaves with large loose auriculate sheaths commonly 2′–4′ long, and a stout erect blade usually 4′–10′ long; panicle 3′–10′ in height, the branches moderately spreading; heads usually crowded, top-shaped to hemispheric or subspheric, 5–40-flowered; perianth 1½″–2″ long, the parts narrowly lanceolate, acute, the inner longer than the outer; stamens 3, one-half to two-thirds as long as the perianth, anthers much shorter than the filaments; capsule lanceolate, acute, mucronate, 3-sided, 1-celled, reddish-brown, exceeding the perianth by ½″ or less; seed ½″ to nearly 1″ long, tailed at either end, the body with a smooth shining coat, about 40-striate.

New Brunswick to Minnesota, Georgia and Louisiana.

Juncus Canadénsis subcaudàtus Engelm. Trans. St. Louis Acad. 2: 474. 1868.

Stems 15′–30′ high, slender, frequently weak and reclining; heads few, scattered; seed with very short tails. Rhode Island to Pennsylvania and Georgia.

Juncus Canadénsis brevicaudàtus Engelm. Trans. St. Louis Acad. 2: 436. 1866.

Juncus Canadensis var. *coarctatus* Engelm. Trans. St. Louis Acad. 2: 474. 1868.

Stems erect, 8′–30′ tall, slender, closely tufted; panicle contracted; heads 2–6-flowered; seed $\frac{2}{5}$″–$\frac{3}{5}$″ in length, long-tailed. Nova Scotia to Minnesota and New Jersey.

38. Juncus acuminàtus Michx. Sharp-fruited Rush. (Fig. 956.)

Juncus acuminatus Michx. Fl. Bor. Am. 1: 192. 1803.

Plant 10′–3° high; rootstock short and inconspicuous. Stems few or several in a tuft, erect, 1–3-leaved; blades of the lower leaves 4′–8′ long, ½″–1″ thick, the upper shorter; inflorescence 2′–6′ high, and with 5–50 heads, rarely larger, or reduced even to a single head, its branches usually spreading; heads top-shaped, hemispheric or subspheric, 3–20-flowered; perianth 1¼″–1¾″ long, its parts lanceolate-subulate, nearly equal; stamens 3, about one-half as long as the perianth; anthers shorter than the filaments; capsule ovate-lanceolate, broadly acute, mucronate, 1-celled, equalling the perianth, light brown at maturity, the valves separating through the apex; seed oblong, about ¼″ in length, tipped at either end, reticulate in 16–20 longitudinal rows, the arcolae transversely many-lined.

Maine to southern Ontario and Minnesota, south to Georgia and Mexico. Also on the northwest coast. Heads often proliferous.

Juncus acuminàtus débilis (A. Gray) Engelm. Trans. St. Louis Acad. 2: 463. 1868.

Juncus debilis A. Gray, Man. 506. 1848.

Smaller, densely tufted, 10′–20′ high, the stems often weak and procumbent; perianth shorter, 1″–1½″ long; capsule linear-oblong, obtuse, about one-third longer than the perianth, short-tipped. New Jersey to South Carolina.

39. Juncus robústus (Engelm.) Coville. Stout Rush. (Fig. 957.)

Juncus acuminatus var. *robustus* Engelm. Trans. St. Louis Acad. 2: 463. 1868.

Plant about 3° high. Stems single or few in a tuft, stout, nearly terete, commonly 1½″–2″ thick below, 1–2-leaved; blades erect, terete, conspicuously many-septate, 8′–2° long, 1″–1¾″ thick, usually reaching or exceeding the inflorescence; inflorescence 4′–10′ high, with moderately spreading branches and innumerable (commonly 300–500) heads, the blade of its lowest leaf sometimes half as long as the inflorescence; heads 2–10-flowered; perianth 1″–1¼″ long, its parts nearly equal, lanceolate-subulate; stamens 3, one-half to two-thirds as long as the perianth; capsule equalling or one-third exceeding the perianth, straw-colored at maturity, narrowly to broadly oblong, obtuse with a short tip, 3-sided when dry, 1-celled, the valves separate and involute after dehiscence; seed nearly as in *J. acuminatus*.

Southern Illinois to southeastern Kansas, Oklahoma, Louisiana and Texas.

40. Juncus diffusissimus Buckley. Diffuse Rush. (Fig. 958.)

Juncus diffusissimus Buckley, Proc. Acad. Phila. 1862: 9. 1862.

Plant 1°–2° high. Stems few in a tuft, from a short-branched inconspicuous rootstock, erect, slender, terete or slightly compressed, 2–4-leaved; blades 4′–8′ long, ½″–¾″ thick; inflorescence diffusely branched, widely spreading, 4′–8′ high and broad, its lowest bract with a blade either obsolete or sometimes nearly as long as the panicle; heads 3–12-flowered; perianth 1¼″–1¾″ long, its parts subulate, equal; stamens half to two-thirds as long as the perianth; anthers shorter than the filaments; capsule narrowly linear-lanceolate in outline, 2″–2¾″ long, acute to obtuse at the apex, with a short tip, 3-sided, light brown, 1-celled; seed oblong to obovoid, ⅕″–¼″ long, acute at the base, abruptly tipped, reticulate in about 16 rows, finely cross-lined.

Southeastern Kansas to Mississippi and Texas.

2. JUNCOÌDES Adans. Fam. Pl. 2: 47. 1763.

[Luzula DC. Fl. Fr. 3: 158. 1805.]

Perennial plants, with herbage either glabrous or sparingly webbed, stems leaf-bearing, leaf-sheaths with united margins, and leaf-blades grass-like. Inflorescence umbelloid, paniculate, or corymbose, often congested; flowers always bracteolate, the bractlets usually lacerate or denticulate; stamens 6 in our species; ovary 1-celled, its 3 ovules with basal insertion; seeds 3, indistinctly reticulate, sometimes carunculate at base or apex, but not distinctly tailed. [Greek, meaning like *Juncus*.]

About 40 species, widely distributed, mostly flowering in spring.

Inflorescence umbelloid, 1 or 2 flowers on each of its branches. 1. *J. pilosum.*
Inflorescence theoretically paniculate, the flowers often crowded in spikelike clusters.
  Outer perianth-parts shorter than the inner; introduced species. 2. *J. nemorosum.*
  Perianth-parts equal or nearly so; native species.
    Flowers 1–3 together, on the branches of an open panicle. 3. *J. parviflorum.*
    Flowers crowded into one or more thick spikes or spike-like clusters.
      Inflorescence nodding. 4. *J. spicatum.*
      Inflorescence erect or spreading, or its individual branches rarely nodding.
        Inflorescence of 1–3 spike-like or capitate flower-clusters, or the leaf-blades sharp-pointed.
          Inflorescence crowded into a single cluster; leaves flat, usually with a blunt apex. 5. *J. nivale.*
          Inflorescence in 1–4 clusters; leaves narrowed above, involute-channeled, apex very sharp. 6. *J. hyperboreum.*
        Inflorescence of 2–12 spike-like or capitate clusters; leaf-blades with blunt points. 7. *J. campestre.*

1. Juncoides pilòsum (L.) Kuntze. Hairy Wood-rush. (Fig. 959.)

Juncus pilosus L. Sp. Pl. 329. 1753.
Luzula pilosa Willd. Enum. Pl. 393. 1809.
Juncoides pilosum Kuntze, Rev. Gen. Pl. 725. 1891.

Tufted, often somewhat stoloniferous. Stems erect, 2–4-leaved, ½°–1° high; leaf-blades 1½″–4″ wide, flat, slightly webbed, especially when young, acuminate into a blunt almost gland-like point; stem leaves with similar but successively shorter blades; inflorescence an umbelloid flower-cluster, with a bract 5″–12″ high, the filiform pedicels equal or nearly so, 1-flowered or sometimes 2-flowered; perianth 1¼″–1½″ long, its parts triangular-ovate, acuminate, brown with hyaline margins, about twice as long as the toothed bractlets; capsule about one-fourth exceeding the perianth, its valves ovate, acuminate; seed about ¼″ long, its body about 1″ in length, provided at the summit with a conspicuous hooked caruncle.

New Brunswick to Alaska, south to New York, Michigan and Oregon, and in the Alleghanies to North Carolina. Also in Europe and Asia.

2. **Juncoides nemorò̀sum** (Poll.) Kuntze. Forest Wood-rush. (Fig. 960.)

Juncus nemorosus Poll. Hist. Pl. Pal. 1: 352. 1776.
Juncoides nemorosum Kuntze, Rev. Gen. Pl. 724. 1891.

Loosely tufted or somewhat stoloniferous. Stems slender, 1°–2½° high, 1–6-leaved below the inflorescence; leaf-blades 1½″–3″ wide, ciliate, flat, tapering to a slender sharp tip; inflorescence diffusely paniculate or corymbose, the few lower bracts foliose, and the lowermost branch often inserted 4′ below the next or more; flowers in clusters of 3–8, the bractlets ovate, entire or sparingly denticulate above, about one-third as long as the perianth; perianth about 1¼″ in length, its parts from reddish brown with pale margins to dirty white throughout, ovate-lanceolate, acute, the outer about one-fifth shorter than the inner; capsule ovoid, acuminate, barely equalling the perianth; seed obliquely ovoid about ⅜″ long.

A European species, naturalized at Riverdale, N. Y.

3. **Juncoides parviflò̀rum** (Ehrh.) Coville. Small-flowered Wood-rush. (Fig. 961.)

Juncus parviflorus Ehrh. Beitr. 6: 139. 1791.
Luzula parviflora Desv. Journ. de Bot. 1: 144. 1808.
J. parviflorum Coville, Contr. Nat. Herb. 4: 209. 1893.

Stems single or few in a tuft, stoloniferous, erect, 10′–30′ high, 2–5-leaved; leaves glabrous, their blades 1½″–5″ wide, tapering to a sharp or blunt apex; inflorescence a nodding decompound panicle, commonly 1½′–4′ high, its lowest bract foliose, seldom more than one-fourth the length of the panicle; flowers borne singly, or sometimes 2 or 3 together, on the branches of the inflorescence, on slender pedicels; bractlets ovate, entire or rarely somewhat lacerate, perianth ¾″–1¼″ in length, its parts ovate, acuminate, slightly exceeded by the green to brown ovoid capsule; seed narrowly oblong, ½″–¾″ in length, attached to its placenta by slender implexed fibers.

Labrador to British Columbia, New Hampshire, New York and Minnesota; in the mountains to Arizona and California. Also in Europe and Asia.

4. **Juncoides spicàtum** (L.) Kuntze. Spiked Wood-rush. (Fig. 962.)

Juncus spicatus L. Sp. Pl. 330. 1753.
Juncoides spicatum Kuntze, Rev. Gen. Pl. 725. 1891.
Luzula spicata DC. Fl. Fr. 3: 161. 1805.

Closely tufted, without rootstocks. Stems erect, 4′–16′ high, distantly 1–3-leaved, tapering to a filiform summit; leaf-blades ½″–1½″ broad, often involute, especially above, tapering to a sharp apex, sparingly webby, especially at the base; inflorescence a nodding, spike-like, often interrupted panicle, commonly ½′–1′ in length, usually exceeded by its lowest involute-foliose bract; bractlets ovate-lanceolate, acuminate, equalling the perianth, sparingly lacerate; perianth brown, with hyaline margins, 1″–1½″ long, its parts lanceolate, aristate-acuminate; capsule broadly ovoid, bluntly acute, about two-thirds as long as the perianth; seed narrowly and obliquely obovoid, about 1½″ long.

Labrador to Alaska, mountains of New England, Colorado and California. Also in Europe and Asia.

5. Juncoides nivàle (Laest.) Coville. Arctic Wood-rush. (Fig. 963.)

Luzula campestris var. *nivalis* Laest. Kongl. Vet. Akad. Handl. 334. 1822.
Juncoides nivale Coville, Mem. Torr. Club, 5: 108. 1894.
Luzula arctica Blytt, Norg. Fl. 1: 299. 1861.

Stems tufted, 2′–4′ high, erect, 1 or 2-leaved. Leaves with sheaths glabrous at the mouth, their blades 1″–2″ broad, seldom exceeding 1½′ in length, very minutely roughened on the back, at least toward the apex, flat and tapering to a usually blunt and callous tip; inflorescence an erect oblong to ovate, spike-like cluster, ½′ in height or less, exceeding its lowest semifoliaceous bract; bractlet and perianth dark purple, the former ovate and sparingly lacerate at the hyaline apex; perianth-parts ¾″–1″ in length, narrowly oblong, more or less broadly acute at the paler apex, sometimes denticulate above; capsule subspheric, obtuse or broadly acute, exceeding the perianth; seed narrowly oblong, about ½″ long.

Baffin Bay to Alaska. Also in arctic and alpine Europe and Asia.

6. Juncoides hyperbòreum (R. Br.) Sheldon. Northern Wood-rush. (Fig. 964.)

Luzula hyperborea R. Br. Suppl. App. Parry's Voy. 183. 1821.
Juncoides hyperboreum Sheldon, Bull. Geol. Surv. Minn. 9: 63. 1894.

Stems tufted, commonly 4′–8′ high, erect, 1–2-leaved above the base. Leaves with sheaths sparingly ciliate at the mouth, the blades erect, ½″–1½″ wide at the base, commonly 2½′–7′ long, usually involute in age, not roughened on the back, tapering into a very sharp point; inflorescence erect, exceeding its lowest foliose bract, consisting of a single oblong cluster ½′ in length or less, or its one or two lower divisions on peduncles ½′–1½′ long; bracts and bractlets membranous, fimbriate; perianth-parts brown, paler above, about 1¼″ long, ovate-lanceolate, acuminate, denticulate, or slightly lacerate at the apex; capsule about three-fourths as long as the perianth, ovoid, obtuse; seed rather narrowly oblong, about ⅔″ long.

Arctic America, Labrador and the higher mountains of New England. Europe and Asia.

7. Juncoides campéstre (L.) Kuntze. Common Wood-rush. (Fig. 965.)

Juncus campestris L. Sp. Pl. 329. 1753.
Luzula campestris DC. Fl. Fr. 3: 161. 1805.
Juncoides campestre Kuntze, Rev. Gen. Pl. 722. 1891.

Stems densely tufted, erect, 4′–20′ high, 2–4-leaved. Leaf-blades flat, 1″–3½″ broad, tapering at the apex to a blunt almost gland-like point, sparingly webbed when young; inflorescence umbelloid; lower bracts foliose, the lowest often exceeding the inflorescence, its several branches straight, unequal, each bearing an oblong to short-cylindric dense spike; floral bracts ovate, acuminate; bractlets similar but smaller, fimbriate at the apex; perianth 1″–1½″ long, brown, its parts lanceolate-ovate, acuminate; capsule obovoid or broadly oblong; seed with an oblong body about ½″ in length, supported on a narrower white loosely cellular, strophiole-like base about one-half as long.

In woodlands, almost throughout the United States and British America. Also in Europe and Asia. Variable. One of our earliest flowering plants.

Family 18. **MELANTHÀCEAE** R. Br. Prodr. 1: 272. 1810.

BUNCH-FLOWER FAMILY.

Leafy-stemmed herbs (some exotic genera scapose), with rootstocks or rarely with bulbs, the leaves broad or grass-like, parellel-veined, the veins often connected by transverse veinlets. Flowers perfect, polygamous, or dioecious, regular, racemose, panicled or solitary. Perianth of 6 separate or nearly separate, usually persistent segments. Stamens 6, borne on the bases of the perianth-segments. Anthers small, 2-celled, oblong or ovate, or confluently 1-celled and cordate or reniform, mostly versatile and extrorsely dehiscent (introrse in *Tofieldia* and *Abama*). Ovary 3-celled, superior or rarely partly inferior; ovules few or numerous in each cavity, anatropous or amphitropous. Styles 3, distinct, or more or less united. Fruit a capsule with septicidal dehiscence (loculicidal in *Abama* and *Uvularia*). Seeds commonly tailed or appendaged. Embryo small, in usually copious endosperm.

About 36 genera and 140 species, widely distributed.

Flowers numerous in terminal erect racemes or panicles.	
Anthers oblong or ovate, 2-celled.	
Anthers introrsely dehiscent.	
Capsule septicidal; flowers involucrate by 3 bractlets.	1. *Tofieldia.*
Capsule loculicidal; flowers not involucrate.	2. *Abama.*
Anthers extrorsely dehiscent.	
Flowers perfect.	
Leaves basal, oblanceolate; seeds numerous.	3. *Xerophyllum.*
Stem very leafy; leaves linear; seeds few.	4. *Helonias.*
Flowers dioecious: stem leafy.	5. *Chamaelirium.*
Anthers cordate or reniform, confluently 1-celled.	
Plants glabrous.	
Perianth-segments not gland-bearing.	
Flowers perfect; perianth-segments obtuse.	6. *Chrosperma.*
Flowers polygamous; perianth-segments acuminate.	7. *Stenanthium.*
Perianth-segments bearing 1 or 2 glands, or a spot.	8. *Zygadenus.*
Stem and inflorescence pubescent.	
Perianth-segments clawed, free from the ovary.	9. *Melanthium.*
Perianth-segments not clawed, aduate to the base of the ovary.	10. *Veratrum.*
Flowers solitary, terminal or opposite the leaves, drooping.	11. *Uvularia.*

1. **TOFIÈLDIA** Huds. Fl. Angl. Ed. 2, 157. 1778.

Perennial herbs, with short erect or horizontal rootstocks, fibrous roots, slender erect stems leafless above or nearly so, linear somewhat 2-ranked and equitant leaves clustered at the base, and small perfect white or green flowers in a terminal raceme. Pedicels bracted at the base, solitary or clustered. Flowers usually involucrate by 3 scarious somewhat united bractlets below the calyx. Perianth-segments oblong or obovate, subequal, persistent, glandless. Stamens 6; filaments filiform; anthers ovate, sometimes cordate, introrse. Ovary sessile, 3-lobed at the summit; styles 3, short, recurved. Capsule 3-lobed, 3-beaked, septicidally dehiscent to the base, many-seeded. Seeds tailed or appendaged in most species. [Dedicated to Tofield, an English correspondent of Hudson.]

About 15 species, natives of the north temperate zone, 1 or 2 in the Andes of South America. Besides the following another occurs in the southeastern States and two in northwestern America.

Stem glabrous; seeds unappendaged.	1. *T. palustris.*
Stem viscid-pubescent; seeds appendaged.	
Capsule oblong, 3″ high; perianth segments thin.	2. *T. glutinosa.*
Capsule ovoid, 1½″–2″ high; perianth-segments rigid in fruit.	3. *T. racemosa.*

1. Tofieldia palústris Huds. Scottish Asphodel. (Fig. 966.)

Tofieldia palustris Huds. Fl. Angl. Ed. 2, 157. 1778.

Glabrous, stem slender, scape-like, leafless or bearing a few leaves near the base, 2′–10′ tall. Leaves tufted, ½′–4′ long, ½″–2″ wide; raceme oblong or subglobose in flower, dense, elongating to an inch or less in fruit, the lower flowers first expanding; pedicels nsually solitary, minutely involucrate, ½″–1″ long in fruit; flowers greenish white, 1″ broad; perianth-segments obovate. obtuse, much shorter than the oblong-globose minutely beaked capsule; seeds oblong, unappendaged.

Greenland and Labrador to Alaska, south to Quebec, the shores of Lake Superior, and the Canadian Rocky Mountains. Also in Europe and Asia. Summer.

2. Tofieldia glutinòsa (Michx.) Pers. Glutinous Tofieldia. (Fig. 967.)

Narthecium glutinosum Michx. Fl. Bor. Am. 1: 210. 1803.

Tofieldia glutinosa Pers. Syn. 1: 399. 1805.

Stem viscid-pubescent with black glands, 6′–20′ tall, bearing 2–4 leaves near the base. Basal leaves tufted, 2′–7′ long, 1″–3″ wide; raceme oblong and ½′–1½′ long in flower, longer in fruit, the upper flowers first expanding; pedicels commonly clustered in 3's (1's–4's), ascending, viscid-pubescent, becoming 2″–6″ long in fruit; involucral bracts minute, united nearly or quite to their apices, borne just beneath the flower; flowers 3″–4″ broad; perianth-segments oblong, mostly obtuse, membranous; capsule oblong, about 3″ high, 1½″ in diameter, thin-walled, twice as long as the perianth, the beaks ½″ long or less; seeds tailed at each end.

In bogs, Newfoundland to Alaska, south to Maine, Ohio, Michigan, Wyoming and Oregon; and in the southern Alleghenies. May–June.

3. Tofieldia racemòsa (Walt.) B.S.P. Viscid Tofieldia. (Fig. 968.)

Melanthium racemosum Walt. Fl. Car. 126. 1788

Narthecium pubens Michx. Fl. Bor. Am. 1: 209. 1803.

Tofieldia pubescens Pers. Syn. 1: 399. 1805.

Tofieldia racemosa B.S.P. Prel. Cat. N. Y. 55. 1888.

Similar to the preceding species but rather stouter and taller, stem 1°–3° high, the glutinous pubescence rougher. Leaves very narrowly linear, 6′–18′ long, 1½″–3″ wide; raceme 1′–4′ long in flower, often loose, somewhat longer in fruit, the uppermost flowers first expanding; pedicels mostly clustered in 3's, ascending, 2″–3″ long in fruit; involucral bractlets about ½″ long, united to above the middle, borne just beneath the flower; perianth-segments narrowly obovate, obtuse, rigid; capsule ovoid, 1½″ long, little longer than the calyx, its beaks ½″ long; seeds tailed at each end.

In swamps, southern New Jersey to Florida and Alabama. This and the two preceding species are also known as False Asphodel. June–Sept.

2. ABÀMA Adans. Fam. Pl. 2: 47. 1763.

[NARTHECIUM Juss. Gen. 47. 1789.]

Perennial herbs, with creeping or horizontal rootstocks, fibrous roots, erect simple stems and linear grass-like basal leaves, those of the stem short and distant. Flowers small, greenish-yellow, perfect, borne in a terminal raceme. Pedicels bracted at base and usually bearing a small bractlet. Perianth-segments persistent, linear or linear-lanceolate, obscurely 3–5-nerved, glandless. Stamens 6; filaments subulate, woolly; anthers linear-oblong, erect, introrse. Ovary sessile; style very short or none; stigma slightly 3-lobed. Capsule oblong, loculicidally dehiscent, many-seeded, the linear seeds tailed at each end. [Greek, signifying without step, the plants reputed to cause lameness in cattle.]

Four known species, natives of the northern hemisphere. Besides the following, another occurs in northwestern America.

1. Abama Americàna (Ker.) Morong. American Bog-asphodel. (Fig. 969.)

Narthecium Americanum Ker, Bot. Mag. *pl. 1505.* 1812.
Narthecium ossifragum var. *Americanum* A. Gray, Man. Ed. 5, 536. 1867.
Abama Americana Morong, Mem. Torr. Club, 5: 109. 1894.

Glabrous, stems wiry, stiff, erect, 10′–18′ tall. Basal leaves 3′–8′ long, 1″ wide or less, finely 7–9-nerved; lower stem leaves ½′–2′ long, the upper much smaller; raceme 1′–2′ long, dense; perianth-segments narrowly linear, 2″–3″ long, slightly exceeding the stamens; filaments white-woolly; pedicels ascending, 3″–4″ long in fruit; capsule about 5″ long, 1″ in diameter at the middle, erect, nearly twice as long as the perianth-segments, tapering to a subulate beak; seeds, including the appendages, 3″–4″ long.

In pine barren swamps, southern New Jersey. June–Sept.

3. XEROPHÝLLUM Michx. Fl. Bor. Am. 1: 210. 1803.

Tall perennial herbs, with thick short woody rootstocks, simple erect leafy stems, the leaves narrowly linear, rough-margined, the upper ones shorter than the lower. Flowers very numerous, medium-sized, white, in a large dense terminal raceme, the lower ones first expanding. Perianth withering-persistent, its segments oblong or ovate, 5–7-nerved, spreading, glandless. Stamens 6, rather shorter than the perianth-segments; filaments subulate, glabrous; anthers oblong. Ovary sessile, 3-grooved; styles 3, filiform, reflexed or recurved, stigmatic along the inner side; ovules only 2–4 in each cell. Capsule ovoid, 3-grooved, loculicidally and sometimes also septicidally dehiscent. Seeds 5, oblong, not at all appendaged, or only minutely so. [Greek, signifying a dry leaf.]

Three species, the following of the southeastern United States, the others of western America.

1. Xerophyllum asphodeloìdes (L.) Nutt. Turkey-beard. (Fig. 970.)

Helonias asphodeloides L. Sp. Pl. Ed. 2, 485. 1762.
Xerophyllum setifolium Michx. Fl. Bor. Am. 1: 211. 1803.
Xerophyllum asphodeloides Nutt. Gen. 1: 235. 1818.

Stem stout, becoming stiff, 2½°–5° tall, densely leafy below and at the base, sparsely leafy above. Leaves very narrowly linear, slightly dilated at the base, the lower 6′–18′ long, 1″ wide or less, except at the broader base, the upper successively shorter and narrower; flowering raceme 3′–6′ long, 2′–3′ in diameter, its summit conic; flowering pedicels spreading, filiform, 9″–18″ long, in fruit erect; perianth-segments ovate-oblong, obtuse, about 3′ long; styles rather longer than the ovary; capsule ellipsoid, obtuse, 2″ long, 1″–1½″ in diameter; seeds mostly 2 in each cell.

In dry pine barrens, southern New Jersey to eastern Tennessee and Georgia. May–July. Ascends to 5000 ft. in North Carolina.

4. HELÒNIAS L. Sp. Pl. 342. 1753.

A perennial glabrous bog herb, with a stout rootstock, thick fibrous roots, basal oblanceolate persistent leaves and rather large perfect purple flowers, racemed at the summit of an erect hollow bracted scape. Perianth-segments spreading, spatulate, persistent. Stamens 6, hypogynous, longer than the perianth-segments; filaments filiform; anthers ovate. Ovary ovoid, 3-grooved, 3-celled, slightly 3-lobed, many-ovuled; styles 3, stigmatic along the inner side, deciduous. Capsule obovoid, deeply 3-lobed, the lobes divergent, ventrally dehiscent above. Seeds numerous, linear, white-appendaged at each end. [Name from the Greek, in allusion to its growth in swamps.]

A monotypic genus of eastern North America.

1. **Helonias bullàta** L. Swamp Pink. (Fig. 971.)

Helonias bullata L. Sp. Pl. 342. 1753.

Leaves several or numerous, dark green, thin, clustered at the base of the scape, 6′–15′ long, ½′–2′ wide, pointed or blunt, finely parallel-nerved. Scape stout, bracted below, the bracts lanceolate, acute or acuminate, membranous; raceme dense, 1′–3′ long in flower, becoming 4′–7′ long in fruit; perianth-segments about 3″ long, equalling or rather longer than the stout pedicels; capsules about 3″ long, the valves papery; seeds 1½″–2″ long.

In bogs, northern New Jersey, southern New York and eastern Pennsylvania (?) to Virginia. Local. The scape sometimes bears a few leaves at its base. April–May.

5. CHAMAELÍRIUM Willd. Mag. Nat. Fr. Berl. 2: 18. 1808.

An erect glabrous slightly fleshy herb, with a bitter tuberous rootstock. Basal leaves spatulate, those of the stem lanceolate. Flowers small, white, dioecious, in a long narrow bractless spike-like raceme. Perianth of 6 linear-spatulate 1-nerved segments. Staminate flowers with 6 stamens, the filaments filiform, the anthers subglobose, 2-celled; pistillate flowers with a 3-celled oblong ovary, 3 short styles, stigmatic along the inner side, and usually with 6 staminodia. Capsule oblong, slightly 3-lobed, loculicidally 3-valved. Seeds 6–12 in each cavity, broadly winged at both ends, narrowly winged on the sides. [Greek, signifying a low lily.]

A monotypic genus of eastern North America.

1. **Chamaelirium lùteum** (L.) A. Gray. Blazing-star. (Fig. 972.)

Veratrum luteum L. Sp. Pl. 1044. 1753.
Chamaelirium Carolinianum Willd. Mag. Nat. Fr. Berl. 2: 19. 1808.
Chamaelirium luteum A. Gray, Man. 503. 1848.

Staminate plant 1½°–2½° tall, the pistillate often taller, sometimes 4° high and more leafy. Basal leaves 2′–8′ long, ½′–1½′ wide, mostly obtuse, tapering into a long petiole; stem leaves lanceolate, the or upper linear, acute or acuminate, sessile or the lower short-petioled; staminate raceme or nodding finally erect, 3′–9′ long, the pedicels spreading, 1″–2″ long; pistillate raceme erect; flowers nearly 3″ broad; capsule oblong or somewhat obovoid, 4″–7″ long, 2″–3″ in diameter.

In moist meadows and thickets, Massachusetts to southern Ontario and Michigan, south to Florida and Arkansas. Called also Devil's-bit, Unicorn-root and Drooping Starwort. May–July.

6. CHROSPÉRMA Raf. Neog. 3. 1825.

[AMIANTHIUM A. Gray, Ann. Lyc. N. Y. 4: 121. 1837.]

An erect glabrous herb, with an ovoid-oblong coated bulb, and numerous long blunt basal leaves, a few short ones on the stem. Flowers perfect, white, in a dense terminal raceme, the lower ones first expanding. Perianth of 6 distinct glandless persistent obtuse segments. Stamens inserted on the bases of the sepals; anthers small, reniform. Ovary ovoid, 3-lobed, 3-celled. Capsule 3-celled, dehiscent above the middle, the cavities 1–2-seeded, its 3 divergent lobes tipped with the subulate styles. Seeds ovoid, reddish brown. [Greek, referring to the colored seeds.]

A monotypic genus of eastern North America.

1. Chrosperma muscaetóxicum (Walt.) Kuntze. Fly-poison. (Fig. 973.)

Melanthium muscaetoxicum Walt. Fl. Car. 125. 1788.

Amianthium muscaetoxicum A. Gray, Ann. Lyc. N. Y. 4: 122. 1837.

Chrosperma muscaetoxicum Kunze, Rev. Gen. Pl. 708. 1891.

Bulb 1½′–2′ long, nearly 1′ in diameter. Stem 1½°–4° tall. Basal leaves 2″–15″ wide, shorter than the stem, the upper few and distant, bract-like; raceme at first ovoid-conic, becoming cylindric, 2′–5′ long; pedicels ascending, 4″–10″ long; bractlets ovate, 1″–2″ long; sepals ovate-oblong, obtuse, 2″–3″ long; filaments filiform, about equalling the sepals; capsule 2″–3″ in diameter above the middle, scarcely as long; seeds about 1½″ long.

In dry sandy woods, Long Island and eastern Pennsylvania to Florida, Tennessee and Arkansas. Ascends to 4000 ft. in Virginia and to 2100 ft. in Pennsylvania. May–July.

7. STENÁNTHIUM Kunth, Enum. 4: 189. 1842.

Erect glabrous bulbous herbs, with leafy stems and small white or greenish, polygamous flowers in an ample terminal panicle. Leaves narrowly linear, keeled. Perianth-segments narrowly lanceolate, acuminate, glandless, spreading, persistent, adnate to the base of the ovary. Stamens shorter than the perianth-segments, inserted on their bases; anthers small, cordate or reniform. Ovary ovoid. Capsule ovoid-oblong, 3-lobed, finally dehiscent to the base, the lobes with short slightly divergent beaks. Seeds about 4 in each cavity, oblong, angled, somewhat flattened. [Greek, in allusion to the narrow perianth-segments.]

The genus comprises only the two following species:

Leaves 2″–3″ wide; capsule reflexed. 1. *S. gramineum.*
Leaves 3″–10″ wide; capsule erect. 2. *S. robustum.*

1. Stenanthium gramíneum (Ker) Morong. Grass-leaved Stenanthium. (Fig. 974.)

Helonias graminea Ker, Bot. Mag. *pl. 1599.* 1813.

Veratrum angustifolium Pursh, Fl. Am. Sept. 242. 1814.

Stenanthium angustifolium Kunth, Enum. 4: 190. 1843.

Stenanthium gramineum Morong, Mem. Torr. Club, 5: 110. 1894.

Stem slender, 3°–4° tall. Leaves grass-like, some of them often 1° long or more, 2″–3″ wide, the upper, reduced to small linear lanceolate bracts subtending the branches of the panicle; panicle open, simple or somewhat compound, 1°–2° long, its branches nearly filiform, often flexuous, spreading or drooping; bracts ½″–1″ long, equalling or longer than the pedicels; flowers 4″–6″ broad; perianth-segments linear lanceolate; capsule ovoid-oblong, with a top-shaped base, 3″–4″ long, reflexed.

In dry soil, Virginia and Kentucky to Florida and Alabama, chiefly in the mountains. Ascends to 6000 ft. in North Carolina. Fruit apparently scarce. Aug–Sept.

2. Stenanthium robústum S. Wats. Stout Stenanthium. (Fig. 675.)

Stenanthium robustum S. Wats. Proc. Am. Acad. **14**: 278. 1879.

Stem stout, 3°–5° tall, usually very leafy. Leaves often 1° long or more, the lower 4″–10″ wide, the upper reduced to bracts; panicle denser than that of the preceding species, commonly longer, usually compound, its branches spreading or ascending; flowers greenish or white, 6″–8″ broad; capsule ovoid-oblong, 4″–6″ long, erect, longer than its pedicel, the very short beaks recurved-spreading.

In moist soil, southern Pennsylvania and Ohio to South Carolina and Tennessee. July–Sept.

8. ZYGADÈNUS Michx. Fl. Bor. Am. 1: 213. 1803.

Glabrous erect perennial herbs, from bulbs or rootstocks, with leafy stems. Leaves narrowly linear. Flowers perfect or polygamous, greenish, yellowish or white, in a terminal panicle or raceme. Perianth withering-persistent, its segments lanceolate or ovate, separate or united below, sometimes adnate to the lower part of the ovary, bearing 1 or 2 glands or a spot just above the narrowed base. Stamens free from the perianth segments and about equalling them in length; anthers cordate or reniform. Capsule 3-lobed, 3-celled, the cavities not diverging, dehiscent to the base. Seeds several or numerous in each cavity, oblong or linear, angled. [Greek, referring to the two glands of some species.]

About 10 species, natives of North America and Mexico, 1 in Siberia.

Plant with a thick rootstock; glands of the perianth-segments 2, orbicular. 1. *Z. glaberrimus.*
Plants bulbous; gland only 1, sometimes faint or a mere spot.
  Gland distinctly obcordate; perianth-segments 4″–5″ long. 2. *Z. elegans.*
  Gland not obcordate; perianth-segments 2″–4″ long.
    Gland with a poorly defined or irregular margin; perianth free from the ovary; western species
      Leaves 3″–8″ wide; flowers mostly perfect. 3. *Z. Nuttallii.*
      Leaves 2″–3″ wide; flowers polygamous. 4. *Z. venenosus.*
    Gland a mere yellow spot; perianth adnate to the ovary; eastern coast species. 5. *Z. leimanthoides.*

1. Zygadenus glabérrimus Michx. Large-flowered Zygadenus. (Fig. 976.)

Zygadenus glaberrimus Michx. Fl. Bor. Am. 1: 214. 1803.

Rather dark green, slightly glaucous, stem stout, 2°–4° tall, from a thick rootstock. Leaves 3″–6″ wide, long-acuminate, channelled, often 1° long or more, the upper gradually smaller, appressed, passing into the short ovate bracts of the panicle; panicle 6′–12′ long, its branches rather stout, stiff, ascending; panicle 6′–12′ long, its branches rather stout, stiff, ascending; pedicels stout, longer than the bractlets; flowers white, mostly perfect, 1′–1½′ broad, perianth-segments lanceolate or oblong-lanceolate, narrowed into a short claw, bearing 2 orbicular glands; styles subulate; capsule narrowly ovoid, shorter than the perianth.

In swamps, Virginia to Florida, near the coast. July–Sept.

2. Zygadenus élegans Pursh. Glaucous Zygadenus. (Fig. 977.)

Zygadenus elegans Pursh, Fl. Am. Sept. 241. 1814.
Melanthium glaucum Nutt. Gen. 1: 232. 1818.
Zygadenus glaucus Nutt. Journ. Acad. Phila. 7: 56. 1834.

Plant very glaucous, bulb ovoid, about 1′ long, its coats membranous. Stem slender, 6′–3° tall; leaves 2″–7″ wide, keeled, the lower 4′–12′ long, the upper much shorter; bracts lanceolate, rather large, green or purplish; inflorescence a simple raceme or a large panicle, sometimes 1° long, open, its branches slender, ascending; flowers greenish, 8″–10″ broad; perianth-segments oval or obovate, obtuse, united below and adnate to the base of the ovary, bearing a single large obcordate gland just above the short claw; capsule oblong, nearly 1′ long, exceeding the perianth.

In moist places, New Brunswick to Alaska, south to Vermont, New York, Missouri, and in the Rocky Mountains to New Mexico. June–Aug. Ascends to 4000 ft. in the Black Hills.

3. Zygadenus Nuttàllii (A. Gray) S. Wats. Nuttall's Zygadenus. (Fig. 978.)

Amianthium Nuttallii A. Gray, Ann. Lyc. N. Y. 4: 123. 1837.
Zygadenus Nuttallii S. Wats. Proc. Am. Acad. 14: 279. 1879.

Light green, scarcely glaucous, stem 1°–2° high. Bulb large, coated; leaves 3″–8″ wide, shorter than the stem, strongly conduplicate, the upper very short; inflorescence racemose or paniculate bracts membranous, scarious, shorter than the slender pedicels; flowers mostly perfect, about 6″ broad; perianth-segments oval or ovate, obtuse, free from the ovary, thin, short-clawed, bearing a roundish spot-like gland; capsule 4″–6″ long.

On prairies, Kansas and Colorado to Texas. May–June.

4. Zygadenus venenòsus S. Wats. Poisonous Zygadenus. (Fig. 979.)

Zygadenus venenosus S. Wats. Proc. Am. Acad. 14: 279. 1879.

Pale green, stem slender, 6′–2° tall, from a small coated bulb. Leaves conduplicate, roughish, 2″–3″ wide, shorter than the stem, the upper small and distant; inflorescence a simple or somewhat branched raceme, 2′–4′ long in flower, elongating in fruit, the slender pedicels longer than the scarious lanceolate bracts; flowers yellow or yellowish, polygamous, about 4″ wide; perianth-segments ovate or elliptic, obtuse or acutish, short-clawed, free from the ovary, bearing a roundish gland with an irregular margin; fruiting pedicels erect; capsule longer than the perianth.

South Dakota and Montana to British Columbia, south to Nebraska, Utah and California. May–June.

5. Zygadenus leimanthoides (A. Gray) S. Wats. Pine-barren Zygadenus. (Fig. 980.)

Amianthium leimanthoides A. Gray, Ann. Lyc. N. Y. 4: 125. 1837.
Zygadenus leimanthoides S. Wats. Proc. Am. Acad. 14: 280. 1879.

Stem slender, 1°–4° high, from a narrowly ovoid fibrous-coated bulb, its base sheathed by short leaves which soon become fibrous. Leaves 2″–4″ wide, green on both sides, often 1° long, blunt, or the upper acuminate and much shorter; panicle 4′–12′ long, its branches densely many-flowered, spreading or ascending; bractlets much shorter than the slender pedicels; flowers mostly perfect, white or greenish, about 4″ broad; perianth-segments oblong, obtuse sessile, not clawed, adnate to the very base of the ovary, bearing a basal yellowish spot; capsule ovoid, 4″ high, much longer than the perianth.

In swamps or wet soil, especially in pine barrens, southern New Jersey to Georgia. Ascends to 4000 ft. in North Carolina. July–Aug.

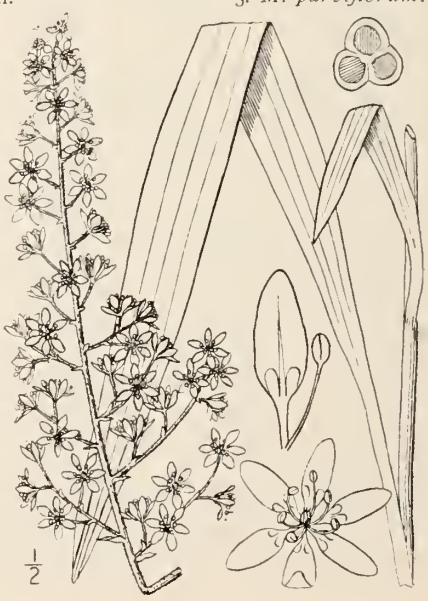
9. MELÁNTHIUM L. Sp. Pl. 339. 1753.

Tall leafy herbs, perennial by thick rootstocks, the stem, at least its upper part, and the inflorescence, pubescent. Leaves oval, oblanceolate or linear, sheathing or the upper sheathless. Flowers greenish, white or cream-colored, darker in withering, monoecious or polygamous, slender pedicelled in a large terminal panicle. Perianth of 6 spreading separate persistent clawed segments, free from the ovary. Stamens shorter than the segments and adnate to them; anthers cordate or reniform, their sacs confluent. Ovary ovoid; styles 3, subulate, spreading. Capsule 3-lobed, 3-celled, the cavities several-seeded, tipped by the styles. Seeds very flat and broadly winged, several in each cavity. [Greek, signifying black flower.]

The genus comprises only the following species:

Perianth-segments with 2 glands at the base of the blade.
  Blade of the perianth-segments oblong, entire; leaves linear. 1. *M. Virginicum.*
  Blade of the perianth-segments nearly orbicular, undulate; leaves oblanceolate. 2. *M. latifolium.*
Perianth segments oblanceolate, glandless; leaves oval. 3. *M. parviflorum.*

1. Melanthium Virgínicum L. Bunch-flower. (Fig. 981.)



Melanthium Virginicum L. Sp. Pl. 339. 1753.

Stems rather stout, 2½°–5° high. Leaves linear, acuminate, often 1° long, 4″–12″ wide, the lower sheathing, the upper smaller, sessile, the uppermost very small; panicle 6′–18′ long, usually dense, its branches ascending; pedicels much longer than the ovate-oblong bracts; flowers 6″–10″ broad, greenish yellow, turning brown; perianth-segments obtuse, the blade oblong, flat, entire, sometimes obcordate, at least twice as long as the claw, bearing 2 dark glands at its base; capsule 5″–7″ long, the persistent styles erect, 1″–1½″ long; seeds 8–10 in each cavity, 2″–3″ long.

In meadows, wet woods and marshes, Rhode Island to New York and Minnesota, south to Florida and Texas. June–Aug.

2. Melanthium latifòlium Desr. Crisped Bunch-flower. (Fig. 982.)

Melanthium hybridum Walt. Fl. Car. 125. 1788?
Melanthium latifolium Desr. in Lam. Encycl. 4: 25. 1797.

Stem stout or slender, 2°–4° tall. Leaves oblanceolate, acute, 6″–2′ wide, the lower clasping, the upper sessile and much smaller; panicle usually 1° long or more, its branches ascending or spreading; flowers 6″–8″ broad, greenish white, turning darker; blade of the perianth-segments orbicular or ovate, undulate and crisped, longer than the claw or about equalling it, bearing 2 glands at the base; capsule 6″–8″ long, its cavities 4–8 seeded; seeds rather larger than those of the preceding species; flowers fragrant.

In dry woods and on hills, Connecticut to Pennsylvania and South Carolina. Ascends to 2000 ft. in North Carolina. Pedicels 3″–8″ long. July–Aug.

Melanthium latifòlium longipedicellàtum A. Brown, Bull. Torr. Club, 23: 152. 1896.

Lower leaves 6″–10″ wide, and upper pedicels 12″ long. West Virginia.

3. Melanthium parviflòrum (Michx.) S. Wats. Small-flowered Melanthium. (Fig. 983.)

Veratrum parviflorum Michx. Fl. Bor. Am. 2: 250. 1803.

Melanthium parviflorum S. Wats. Proc. Am. Acad. 14: 276. 1879.

Stem slender, 2°–5° tall. Lower leaves broadly oval or oblanceolate, acute, 4′–8′ long, 1½′–4′ wide, with narrow sheathing bases, the upper narrowly linear-lanceolate, acuminate; panicle 1°–2° long, loose and open, its very slender branches divergent or ascending; pedicels filiform, much longer than the bracts, somewhat longer than the perianth-segments; flowers 4″–6″ broad, greenish; perianth-segments oblanceolate, glandless, short-clawed or sessile; capsule 5″–6″ long, the cavities 4–6-seeded; seeds 3″–4″ long.

In dry woods, mountains of Virginia to South Carolina. June–Aug.

10. VERÀTRUM L. Sp. Pl. 1044. 1753.

Tall perennial herbs, with thick short poisonous rootstocks, the leaves mostly broad, clasping, strongly veined and plaited, the stem and inflorescence pubescent. Flowers greenish or yellowish or purple, rather large, polygamous or monoecious, on short stout pedicels in large terminal panicles. Perianth-segments 6, glandless or nearly so, not clawed, adnate to the base of the ovary. Stamens opposite the perianth-segments and free from them, short, mostly curved. Anthers cordate, their sacs confluent. Ovary ovoid; styles 3, persistent. Capsule 3-lobed, 3-celled, the cavities several-seeded. Seeds very flat, broadly winged. [Ancient name of the Hellebore.]

About 10 species, natives of north temperate zone. Besides the following another occurs in the southern United States and 2 on the Pacific coast.

Flowers yellowish green; perianth-segments pubescent, ciliate. 1. *V. viride.*
Flowers purple; perianth-segments glabrous or nearly so. 2. *V. Woodii*

1. Veratrum viride Ait. American White Hellebore. Indian Poke. (Fig. 984.)

Veratrum viride Ait. Hort. Kew. 3: 422. 1789.

Rootstock erect, 2′–3′ long, 1′–2′ thick, with numerous fibrous-fleshy roots. Stem stout, 2°–8° tall, very leafy; leaves acute, the lower broadly oval or elliptic, 6′–12′ long, 3′–6′ wide, short-petioled or sessile, sheathing, the upper successively narrower, those of the inflorescence small; panicle 8′–2° long, densely many-flowered, its lower branches spreading or somewhat drooping; pedicels 1″–3″ long, mostly shorter than the bracts; flowers yellowish green, 8″–12″ broad; perianth-segments oblong or oblanceolate, ciliate-serrulate, twice as long as the stamens; ovary glabrous; capsule 10″–12″ long, 4″–6″ thick, many-seeded; seed 4″–5″ long.

In swamps and wet woods, Quebec to Alaska, south to Georgia, Tennessee, Minnesota and British Columbia. Ascends to 4000 ft. in the Adirondacks. May–July.

2. Veratrum Woòdii Robbins. Wood's False Hellebore. (Fig. 985.)

Veratrum Woodii Robbins in Wood, Classbook, Ed. 41, 557. 1855.

Rootstock short, erect. Stem slender, 2°–5° tall; leaves mostly basal, oblong or oblanceolate, often 1° long, 2′–4′ wide, narrowed into sheathing petioles about as long as the blade; upper leaves small and linear-lanceolate; panicle open, 1°–2° long, its branches ascending; pedicels shorter than the perianth, about as long as the bracts; flowers 6″–8″ broad, purple; perianth-segments oblanceolate, obtuse, nearly or quite glabrous, entire, little longer than the stamens; ovary pubescent when young, becoming glabrous; capsule 6″–8″ long, few-seeded.

In dry woods and on hills, southern Indiana to Missouri. June–July.

11. UVULÀRIA L. Sp. Pl. 304. 1753.

Erect forked herbs, perennial by rootstocks. Stem leafy above, scale-bearing below, the leaves alternate, sessile or perfoliate. Flowers large, solitary at the ends of the branches or rarely 2 together, peduncled, drooping. Perianth bell-shaped or narrower; segments distinct, deciduous, each bearing a nectary at the base. Stamens 6, free, or adnate to the very bases of the perianth-segments; filaments filiform; anthers linear, the sacs longitudinally dehiscent. Ovary 3-lobed, 3-celled, short-stalked or sessile; styles united to about the middle, stigmatic along the inner side above; ovules several in each cell. Capsule ovoid or obovoid, 3-angled or 3-winged, loculicidally dehiscent. Seeds globose, 1–3 in each cavity. [Name Latin, from *uvula*, a palate, in allusion to the hanging flowers.]

Five or six species, natives of eastern North America.

Capsule obtusely 3-angled, truncate or rounded; leaves perfoliate.
- Glabrous, glaucous; perianth-segments papillose within. — 1. *U. perfoliata.*
- Leaves pubescent beneath; perianth-segments smooth. — 2. *U. grandiflora.*

Capsule acutely 3-angled or 3-winged, acute at each end; leaves sessile.
- Leaves thin, slightly rough-margined, narrowed at both ends. — 3. *U. sessilifolia.*
- Leaves firm, manifestly rough-margined, sometimes subcordate. — 4. *U. puberula.*

1. Uvularia perfoliàta L. Perfoliate Bellwort. (Fig. 986.)

Uvularia perfoliata L. Sp. Pl. 304. 1753.

Glabrous and glaucous or pale green. Stems 6′–20′ high, slender, forked above the middle, usually with 1–3 leaves below the fork; leaves oval, oblong or ovate-lanceolate, acute at the apex, rounded or sometimes narrowed at the base, smooth-margined, 2′–5′ long when mature, small at flowering time; flowers 10″–16″ long, pale yellow; peduncle becoming ½′–1′ long in fruit; perianth-segments granular-papillose within, sometimes but slightly so; stamens shorter than the styles or equalling them, the connective sharp-tipped; capsule obovoid, truncate, thicker than long, 4″–5″ long, obtusely 3-angled, with concave sides and grooved angles, its lobes dehiscent above.

In moist woods and thickets, Quebec and Ontario to Florida and Mississippi. Ascends to 3500 ft. in Virginia. Flowers fragrant. May–June.

2. Uvularia grandiflòra J. E. Smith. Large-flowered Bellwort. (Fig. 987.)

Uvularia grandiflora J. E. Smith, Ex. Bot. 1: 99. *pl.* 51. 1804–5.

Stems rather stouter than that of the preceding species, naked or with 1 or 2 leaves below the fork, Leaves perfoliate, oblong, oval or ovate, pubescent beneath, at least when young, glabrous above, becoming 2′–5′ long; flowers lemon-yellow, 1′–1½″ long; perianth-segments smooth on both sides or very slightly granular within; stamens exceeding the styles, the connective blunt; capsule obtusely 3-angled, truncate, 4″–5″ long, the lobes dehiscent above.

In rich woods, Quebec to Minnesota, south to Georgia, Tennessee and Iowa. April–June.

3. Uvularia sessilifòlia L. Sessile-leaved Bellwort. (Fig. 988.)

Uvularia sessilifolia L. Sp. Pl. 305. 1753.
Oakesia sessilifolia S. Wats. Proc. Am. Acad. 14: 269. 1879.

Glabrous, stem slender, naked or bearing 1 or 2 leaves below the fork. Leaves oblong or oblong-lanceolate, 1½′–3′ long when mature, thin, sessile, acute at each end, roughish-margined, pale or glaucous beneath; flowers greenish yellow, 8″–15″ long; perianth-segments smooth; styles exceeding stamens; anthers blunt; peduncle ½′–1′ long in fruit; capsule sharply 3-angled, narrowed at both ends, short-stipitate, about 1′ long, 6″–8″ thick.

In moist woods and thickets, New Brunswick and Ontario to Minnesota, south to Georgia and Arkansas. May–June.

Uvularia sessilifòlia nitida (Britton) Morong, Mem. Torr. Club, 5: 111. 1894.

Oakesia sessilifolia var. (?) *nitida* Britton, Trans. N. Y. Acad. Sci. 9: 13. 1889.

Leaves smaller, bright green on both sides: flowers light yellow; capsule scarcely stipitate. Pine barrens of New Jersey. Perhaps referable to the following species.

4. Uvularia pubérula Michx. Mountain Bellwort. (Fig. 989.)

Uvularia puberula Michx. Fl. Bor. Am. 1: 199. 1803.
Oakesia puberula S. Wats. Proc. Am. Acad. **14**: 269. 1879.

Stem rather stout, sparingly rough-pubescent with short hairs, at least on the forks. Leaves oblong, oval or ovate; rough-margined, firm and 1½′–3′ long when mature, sessile, acute at the apex, obtuse, subcordate or sometimes narrowed at the base, shining, green on both sides, the midvein sometimes pubescent; flowers light yellow, about 1′ long; styles exceeding the stamens; capsule sharply 3-angled, acute at both ends, sessile or very nearly so on the short peduncle, 10″–12″ long.

In mountain woods, Virginia and West Virginia to South Carolina. Ascends to 5000 ft. in Virginia. May–June.

Family 19. LILIÀCEAE Adans. Fam. Pl. : 42. 1763.

Lily Family.

Scapose or leafy-stemmed herbs from bulbs or corms, or rarely with rootstocks or a woody caudex (*Agave*), the leaves various. Flowers solitary or clustered, regular, mostly perfect. Perianth parted into 6 distinct or nearly distinct segments, or these more or less united into a tube, inferior or partly superior (*Aletris*). Stamens 6, hypogynous or borne on the perianth or at the bases of its segments; anthers 2-celled, mostly introrse, sometimes extrorse. Ovary 3-celled; ovules few or numerous in each cavity, anatropous or amphitropous; styles united; stigma 3-lobed or capitate. Fruit a loculicidal capsule (septicidal in *Calochortus*), or in *Agave* sometimes fleshy and indehiscent. Seeds various, winged or wingless. Embryo in copious endosperm.

About 125 genera and 1300 species, widely distributed.

* Plants bulbous, or with rootstocks, or fibrous-fleshy roots.

Ovary superior, not adnate to the perianth.
- Roots fibrous-fleshy; scape tall; flowers orange or yellow. — 1. *Hemerocallis.*
- Low fleshy herb with a short rootstock; flowers white. — 2. *Leucocrinum.*
- Plants with bulbs or corms.
  - Flowers umbelled.
    - Perianth 6-parted.
      - Odor characteristically onion-like; ovules 1 or 2 in each cavity. — 3. *Allium.*
      - Odor not onion-like; ovules several in each cavity. — 4. *Nothoscordum.*
    - Perianth funnelform, the tube about as long as the lobes. — 5. *Androstephium.*
  - Flowers solitary, racemed, corymbed or paniculed.
    - Anthers not introrse.
      - Perianth-segments all alike or nearly so; capsule loculicidal.
        - Anthers versatile; tall herbs. — 6. *Lilium.*
        - Anthers not versatile; low herbs.
          - Stem leafy; flowers leafy-bracted. — 7. *Fritillaria.*
          - Leaves only 2, appearing basal; flowers bractless. — 8. *Erythronium.*
      - Outer segments narrower than the inner; capsule septicidal. — 9. *Calochortus.*
    - Anthers introrse.
      - Perianth of 6 separate segments.
        - Filaments filiform. — 10. *Quamasia.*
        - Filaments flattened. — 11. *Ornithogalum.*
      - Perianth globose, oblong or urn-shaped. — 12. *Muscari.*

Ovary half inferior; roots fibrous; flowers racemed. — 13. *Aletris.*

** Stem a woody caudex; leaves rigid, mostly bearing marginal fibres. — 14. *Yucca.*

1. HEMEROCÁLLIS L. Sp. Pl. 324. 1754.

Tall glabrous herbs, with fibrous fleshy roots, basal linear leaves and large mostly orange or yellow flowers clustered at the ends of leafless scapes. Perianth funnelform, its lobes oblong or spatulate, much longer than the cylindric tube. Stamens 6, inserted at the summit of the perianth-tube, shorter than the lobes, declined; filaments filiform; anthers linear-oblong, the sacs introrsely dehiscent. Ovary oblong, 3-celled; ovules numerous in each cavity; style slender, declined, tipped with a small capitate stigma. Capsule oblong or ovoid, thick-walled, 3-angled, transversely wrinkled, loculicidally 3-valved. [Greek, signifying beautiful for a day.]

About 5 species, natives of Europe and Asia.

1. Hemerocallis fúlva L. Day Lily. (Fig. 990.)

Hemerocallis fulva L. Sp. Pl. Ed. 2, 462. 1762.

Scapes 3°–6° high, stout, mostly longer than the leaves. Leaves 4″–6″ wide, channeled, tapering to an acute tip; scape bearing several short bracts above; flowers 6–15, short-pedicelled, tawny orange, panicled, 4′–5′ long, opening for a day; tube of the perianth 1′–1½′ long, the lobes oblong, somewhat spreading, netted-veined; the three outer nearly flat, acutish; the 3 inner undulate and blunt.

In meadows and along streams, New Brunswick and Ontario to Virginia and Tennessee. Escaped from cultivation. Native of Europe and Asia. June–Aug.

Hemerocallis flàva L., the Yellow Day Lily, with bright yellow flowers, their lobes parallel-veined, is occasionally found near old gardens.

2. LEUCÓCRINUM Nutt.; A. Gray, Ann. Lyc. N. Y. 4: 110. 1837.

A low acaulescent rather fleshy herb, from a short rootstock, the roots thick, fibrous. Outer leaves membranous, acute, short; inner leaves linear, elongated, the innermost reduced to bracts. Flowers large, white, umbellate from the subterranean axils. Pedicels filiform. Perianth with a very narrow tube and a salverform limb, persistent, the 6 linear-oblong lobes spreading, nerved, shorter than the tube. Stamens borne near the top of the perianth-tube, shorter than the lobes; filaments filiform; anthers linear, their sacs introrsely dehiscent. Ovary ovoid, 3-celled; style filiform stigma small. Capsule oval or obovoid, 3-angled, sessile, obtuse, loculicidal. Seeds several in each cavity, angled. [Greek, meaning white lily.]

A monotypic genus of northwestern North America

1. Leucocrinum montànum Nutt. Leucocrinum. (Fig. 991.)

Leucocrinum montanum Nutt.; A. Gray, Ann. Lyc. N. Y. 4: 110. 1837.

Root-fibres very thick, numerous. Inner leaves 2′–10′ long, 1″–3″ wide; flowers 3–8; pedicels ½′–2′ long; perianth-limb about ½′ broad, the lobes acute; perianth-tube 1′–2′ long, less than 1″ in diameter; filaments 3″–4″ long; anthers coiled, at least when dry; capsule 3″–4″ long, erect, leathery; seeds 4–6 in each cavity, black.

In sandy soil, South Dakota and western Nebraska to California. Ascends to 5500 ft. in the Black Hills. April–June.

3. ÁLLIUM L. Sp. Pl. 294. 1753.

Bulbous herbs, characteristically odorous (alliaceous), the bulbs solitary, or clustered on short rootstocks. Leaves narrowly linear, or rarely lanceolate or oblong, sheathing, basal, or sometimes also on the stem. Stem (usually a scape) simple, erect. Flowers white, purple, pink or green, in a terminal simple umbel, subtended by 2 or 3 membranous separate or united bracts. Pedicels slender, not jointed. Perianth persistent, the 6 segments separate, or united by their very bases. Stamens inserted on the bases of the perianth-segments; filaments filiform or dilated, sometimes toothed; anther-sacs introrsely dehiscent. Ovary sessile or nearly so, completely or incompletely 3-celled; style filiform, jointed, usually deciduous; stigmas small; ovules 1–6 in each cavity. Capsule loculicidal. [Latin for garlic.]

About 275 species of wide distribution. Besides the following, some 40 others occur in the western United States.

Leaves oblong-lanceolate, absent at flowering time. 1. *A. tricoccum.*
Leaves linear, present at flowering time.
Bulb-coats membranous, not fibrous reticulated.
Umbel capitate; pedicels shorter than the flowers. 2. *A. Schoenoprasum.*
Umbel loose; pedicels much longer than the flowers.
Flowering umbel nodding. 3. *A. cernuum.*
Flowering umbel erect.
Leaves flat or channeled, all nearly basal. 4. *A. stellatum.*
Leaves terete, hollow, several on the stem; flowers often replaced by bulblets. 5. *A. vineale.*
Bulb-coats fibrous-reticulated.
Capsule not crested.
Flowers mostly replaced by bulblets; scape 1°–2° tall. 6. *A. Canadense.*
Flowers rarely replaced by bulblets.
Scape 1°–2° tall; pedicels 8″–12″ long; perianth segments thin. 7. *A. mutabile.*
Scape 4′–8′ tall; pedicels 4″–6″ long; perianth-segments rigid in fruit. 8. *A. Nuttallii.*
Capsule-valves with 2 short crests. 9. *A. reticulatum.*

1. Allium tricóccum Ait. Wild Leek. (Fig. 992.)

Allium tricoccum Ait. Hort. Kew. 1: 428. 1789.

Bulbs ovoid, clustered, 1′–2′ high, seated on a short rootstock, their coats fibrous-reticulated. Leaves oblong-lanceolate or elliptic, appearing early in the spring, but withering and disappearing before flowering time, 6′–12′ long, 1′–2′ wide, narrowed at both ends, tapering into a long petiole; scape 4′–15′ tall; bracts of the umbel usually 2, at first enclosing the flowers, membranous, acuminate, deciduous; umbel many-flowered, erect; pedicels slender, becoming rigid, 6″–10″ long; flowers white; perianth-segments oblong, obtuse, 2″–3″ long; filaments lanceolate-subulate, about as long as the perianth; ovule 1 in each cavity of the ovary; capsule deeply 3-lobed, about 3″ broad, 1½″–2″ high, its valves not crested; seeds globose, black, smooth.

In rich woods, New Brunswick to Minnesota, south to North Carolina and Tennessee. Often grows in large beds. Ascends to 4500 ft. in North Carolina. June–July.

2. Allium Schoenóprasum L. Chives. Chive Garlic. (Fig. 993.)

Allium Schoenoprasum L. Sp. Pl. 301. 1753.

Bulbs narrowly ovoid, clustered, 1′ high or less, their membranous coats not fibrous-reticulated. Scape rather stout, 8′–2° high, bearing below the middle 1 or 2 elongated linear terete hollow leaves about ½″ in diameter, or the leaves all basal; bracts of the umbel 2, broadly ovate, veiny; umbel many-flowered, capitate, the pedicels 1″–3″ long; flowers rose-color, longer than the pedicels; perianth-segments 4″–6″ long, lanceolate, acuminate; stamens much shorter than the perianth; filaments subulate, half-terete; ovules 2 in each cavity of the ovary; capsule obtusely 3-lobed, about half as long as the perianth.

In moist or wet soil, New Brunswick to Alaska, south to Maine, northern New York, Michigan, Wyoming and Washington. Also in Europe and Asia. June–July.

3. Allium cérnuum Roth. Nodding Wild Onion. (Fig. 994.)

A. cernuum Roth; Roem. Arch. 1: Part 3, 40. 1798.

Bulbs usually clustered on a short rootstock, narrowly ovoid, with a long neck, 1′–2½′ high, the coats not fibrous-reticulated. Scape slender, slightly ridged, 1°–2° high; leaves linear, channeled or nearly flat, 1″–2″ wide, mostly shorter than the scape, bluntish, umbel many-flowered, nodding in flower, subtended by 2 short deciduous bracts; pedicels filiform, 8″–15″ long; flowers white, rose or purple; perianth-segments ovate-oblong, acute or obtusish, 2″–3″ long; stamens longer than the perianth; filaments nearly filiform; ovules 2 in each cavity of the ovary; capsule 3-lobed, rather shorter than the perianth, each valve bearing 2 short processes near the summit.

On banks and hillsides, New York to Minnesota and British Columbia, South Carolina, South Dakota, and in the Rocky Mountains to New Mexico. Variable. Ascends to 4000 ft. in North Carolina. July–Aug.

4. Allium stellàtum Ker. Prairie Wild Onion. (Fig. 995.)

Allium stellatum Ker, Bot. Mag. *pl. 1576.* 1813.

Bulbs solitary or several together, narrowly ovoid, 1′–2′ long, their coats membranous. Scape slender, 8′–18′ tall, somewhat ridged above; leaves linear, ¾″–1¼″ wide, nearly flat; umbel several–many-flowered, erect, subtended by 2 lanceolate or ovate acuminate bracts; pedicels filiform, 6″–10″ long; flowers rose-color; perianth-segments ovate-oblong, acute, 2″–3″ long, equalling or rather shorter than the stamens; filaments filiform, slightly widened at the base; capsule shorter than the perianth, 3-lobed, about 6-seeded, each valve bearing 2 erect processes or crests below the apex.

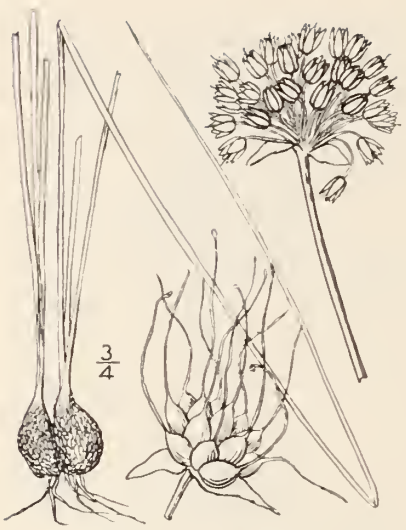
On rocky banks, Illinois and Minnesota to Missouri and Kansas. July–Aug.

5. Allium vineàle L. Wild Garlic. Field Garlic. Crow Garlic. (Fig. 996.)

Allium vineale L. Sp. Pl. 299. 1753.

Bulb ovoid, 1′ high or less, its coats membranous. Stem 1°–3° tall, bearing 2–4 narrowly linear terete hollow somewhat channeled leaves below the middle at flowering time, the early basal leaves similar, numerous, 4′–10′ long; bracts of the umbel 2, lanceolate, acuminate, deciduous; umbel few–many-flowered, erect, the flowers often wholly or in part replaced by small ovoid bulblets which are tipped with a long capillary appendage; pedicels 3″–12″ long, filiform, the lower spreading or drooping; flowers green or purple, about 2″ long; perianth-segments ovate lanceolate, stamens included or slightly exserted; filaments flattened, broad, the 3 interior ones bearing a tooth on each side just below the anther; capsule 3-lobed, shorter than the perianth.

In fields and meadows, Connecticut to Ohio, Missouri and Virginia. Naturalized from Europe. A troublesome weed in the Middle States, infesting pastures, and tainting the flavor of spring butter. June–July.



6. Allium Canadénse L. Meadow Garlic. (Fig. 997.)

Allium Canadense L. Sp. Pl. 1195. 1753.

Bulb ovoid, solitary, usually less than 1′ high, the outer coats fibrous-reticulated. Scape terete, 8′–2° tall; leaves basal or nearly so, narrowly linear, flat or flattish above, slightly convex beneath, 1″–1½″ wide, usually shorter than the scape; bracts of the umbel 2 or 3, white, broadly ovate, acuminate; flowers usually or often replaced by ovoid bulblets; pedicels, when present, about ½′ long; flowers pink or white, the perianth-segments oblong-lanceolate, acute, about as long as the stamens; filaments widened at the base, none of them toothed; capsule valves not crested.

In moist meadows and thickets, Maine to Minnesota, south to Florida, Louisiana and Arkansas. Ascends to 2500 ft. in Virginia. May–June.

7. Allium mutábile Michx. Wild Onion. (Fig. 998.)

Allium mutabile Michx. Fl. Bor. Am. 1: 195. 1803.

Bulbs ovoid, solitary or several together, 1′ high or less, their coats prominently fibrous-reticulated. Scape terete, 1°–2° tall; leaves basal, channeled, 1″–2″ wide, shorter than the scape; bracts of the umbel 2 or 3, long-acuminate; umbel erect, many-flowered, rarely bulblet-bearing; pedicels filiform, 8″–12″ long; flowers pink, rose or white, 2½″–4″ long; perianth-segments lanceolate or ovate-lanceolate, acute, acuminate, or obtusish, thin, longer than the stamens; filaments somewhat widened below; capsule rather shorter than the perianth, its valves not crested.

In moist soil, North Carolina to Nebraska, south to Florida and Texas. April–June.

8. Allium Nuttàllii S. Wats. Nuttall's Wild Onion. (Fig. 999.)

Allium Nuttallii S. Wats. Proc. Am. Acad. 14: 227. 1879.

Bulbs usually solitary, ovoid, ½′–1′ high, their coats fibrous-reticulated. Culm slender, terete or nearly so, 4′–8′ tall; leaves basal, ½″–1″ wide, shorter than the scape or sometimes equalling it; bracts of the umbel 3 or 2, ovate or ovate-lanceolate, acute or acuminate; umbel several-flowered; no bulblets seen; pedicels slender, 4″–6″ long; flowers rose or white, about 3″ long; perianth-segments ovate, acute or acuminate, firm, becoming rigid in fruit; stamens shorter than the perianth; capsule shorter than the perianth, its valves not crested.

On prairies, Nebraska and Colorado to Texas and Arizona. April–June.

9. Allium reticulàtum Don. Fraser's Wild Onion. (Fig. 1000.)

Allium reticulatum Nutt. Fraser's Cat. Name only. 1813.
Allium reticulatum Don, Mem. Wern. Soc. 6: 36. 1826–31.

Similar to the preceding species, the bulb rather larger, its coats prominently fibrous-reticulated. Scape 3′–10′ tall, slender; leaves usually less than 1″ wide; bracts of the several-flowered umbel mostly 2, acuminate; pedicels slender, 3″–6″ long; flowers white or pink, 2½″–3″ long; perianth-segments longer than the stamens, thin; capsule shorter than the perianth, each of its valves bearing 2 short crests just below the summit.

Assiniboia and South Dakota to New Mexico and Arizona. May-July.

4. NOTHOSCÓRDUM Kunth, Enum. 4: 457. 1843.

Scapose herbs, similar to the onions, but without alliaceous odor, with membranous-coated bulbs, narrowly linear basal leaves and small yellow or yellowish-green flowers in an erect terminal simple 2-bracted umbel. Perianth 6-parted to the base, withering-persistent, its segments 1-nerved. Stamens 6, inserted on the bases of the perianth-segments; filaments filiform or subulate; anther-sacs introrsely dehiscent. Ovary sessile, 3-celled; ovules several in each cavity; style filiform, jointed near the base, but commonly persistent; stigma small, capitate. Capsule 3-lobed, loculicidal. Seeds angled or flattish, black. [Greek, signifying false garlic.]

About 10 species, the following in the southern United States and Mexico, 8 or 9 in tropical and South America, 1 Chinese.

1. Nothoscordum biválve (L.) Britton. Yellow False Garlic. (Fig. 1001.)

Ornithogalum bivalve L. Sp. Pl. 306. 1753.
Allium ornithogaloides Walt. Fl. Car. 121. 1788.
Allium striatum Jacq. Coll. Suppl. 51. 1796.
Nothoscordum striatum Kunth, Enum. 4: 459. 1843.

Bulb globose, less than 1′ in diameter, its coats membranous. Leaves ½″–2½″ wide, flat, blunt or acutish, shorter than the scape or equalling it; bracts of the umbel lanceolate, acuminate, membranous, persistent; umbel 6–12-flowered; pedicels filiform, usually unequal, becoming rather rigid and 1′–2′ long in fruit; flowers 5″–6″ long; perianth-segments thin, oblong-lanceolate, acute, longer than the stamens; capsule obovoid or somewhat depressed, obtusely 3-lobed, 2″–3″ high, the style as long or slightly longer.

In sandy soil, Virginia to Tennessee and Nebraska, south to Florida, Texas and Mexico. Ascends to 1500 ft. in Georgia. March-July.

5. ANDROSTÈPHIUM Torr. Bot. Mex. Bound. Surv. 218. 1859.

Scapose herbs from a small membranous-coated corm. Leaves basal, narrowly linear. Flowers rather large, blue, in a terminal erect several-bracted umbel. Perianth funnelform, withering-persistent, the tube about as long as the 6 oblong lobes. Stamens 6, inserted on the throat of the perianth; filaments dilated, united to the middle or above into an erect crown-like tube with toothed lobes alternating with the linear-oblong anthers. Ovary sessile, 3-celled; ovules several in each cavity; style filiform; stigma 3-grooved. Capsule membranous, 3-angled, loculicidal. Seeds few, large, oval, black. [Greek, referring to the crown.]

Two species, natives of the southwestern United States.

1. Androstephium coerùleum (Scheele) Greene. Androstephium. (Fig. 1002.)

Milla coerulea Scheele, Linnaea, 25: 260. 1852.
Androstephium violaceum Torr. Bot. Mex. Bound. Surv. 219. 1859.
Androstephium coeruleum Greene, Pittonia, 2: 57. 1890.

Corm subglobose, less than 1′ in diameter. Scape 2′–8′ tall, simple; leaves 1″–2″ wide, half terete, equalling the scape, or sometimes longer; bracts of the umbel 2–4, scarious, lanceolate, acuminate, persistent, shorter than the pedicels; umbel 2–7-flowered; pedicels rather stout, ¼′–1½′ long; perianth 10″–14″ long, the lobes about as long as the tube; filament-tube about 5″ long, its lobes exceeding the anthers; style about as long as the filament-tube; capsule 4″–6″ high; seeds nearly 3″ long, very thin, narrowly winged.

Prairies, Kansas to Texas. March–April.

6. LÍLIUM L. Sp. Pl. 302. 1753.

Tall bulbous herbs, with simple leafy stems, and large erect or drooping showy flowers. Perianth funnelform or campanulate, diciduous, of 6 separate spreading or recurved segments, each with a nectar-bearing groove at its base within. Stamens 6, mostly shorter than the perianth, hypogynous, slightly attached to the segments; filaments filiform or subulate; anthers linear, versatile, their sacs longitudinally dehiscent. Ovary 3-celled; ovules numerous; style long, somewhat club-shaped above; stigma 3-lobed. Capsule oblong or obovoid, loculicidally dehiscent. Seeds numerous, flat, horizontal, packed in 2 rows in each cavity. [Latin, from the Greek name of the Lily, said to be from the Celtic *li*, white.]

About 45 species, natives of the north temperate zone. Besides the following, some 8 others occur in western North America.

Flower or flowers erect; perianth-segments narrowed into long claws.
- Perianth-segments merely acute.
  - Leaves lanceolate, nearly all verticillate. — 1. *L. Philadelphicum.*
  - Leaves narrowly linear, nearly all alternate. — 2. *L. umbellatum.*
- Perianth-segments long-acuminate; leaves all alternate, appressed. — 3. *L. Catesbaei.*

Flowers drooping or spreading; perianth-segments not clawed.
- Leaves or most of them verticillate, their axils not bulbiferous; native species.
  - Leaves finely roughened on the veins beneath.
    - Perianth-segments recurved or spreading. — 4. *L. Canadense.*
    - Perianth-segments not recurved; mountain species. — 5. *L. Grayi.*
  - Leaves perfectly smooth; perianth-segments recurved.
    - Leaves lanceolate; stem 3°–10° tall; flowers 1–40. — 6. *L. superbum.*
    - Leaves oblanceolate; stem 2°–3° tall; flowers 1–3. — 7. *L. Carolinianum.*
- Leaves all alternate, crowded, the upper axils bulb-bearing; escaped from gardens. — 8. *L. tigrinum.*

1. Lilium Philadélphicum L. Red Lily. Wood Lily. Philadelphia Lily. (Fig. 1003.)

Lilium Philadelphicum L. Sp. Pl. Ed. 2, 435. 1762.

Bulb 1′ in diameter or less, composed of narrow jointed fleshy scales. Stem 1°–3° tall, with a few distant scales below, leafy above; leaves lanceolate, acute at both ends or the lower sometimes obtuse, 1′–4′ long, 3″–7″ wide, all verticillate in 3's–8's, or a few of them alternate, thin, the margins finely roughened; flowers 1–5, erect, 2½′–4′ high; perianth reddish orange, its segments spatulate, somewhat spreading, acute or obtusish, the blade ½′–1′ wide, rather gradually narrowed into the claw, purple spotted below; capsule obovoid-oval, 1¼′–2′ high; seeds 3″–4″ long, narrowly winged.

In dry woods and thickets, Maine to Ontario, south to North Carolina and West Virginia. Ascends to 4000 ft. in Virginia. June–July.

2. Lilium umbellàtum Pursh. Western Red Lily. (Fig. 1004.)

Lilium andinum Nutt. Fras. Cat. Without description. 1813.

Lilium umbellatum Pursh, Fl. Am. Sept. 229. 1814.

Bulb similar to that of the preceding species, the stem usually more slender, 1°–2° tall. Leaves linear, blunt or the upper acute, ascending, or sometimes appressed, 1′–3′ long, 1″–2½″ wide, all alternate or the uppermost verticillate, their margins finely roughened; flowers 1–3, erect, 2′–3′ high; perianth-segments red, orange or yellow, narrowed into the claw, acute, spotted below, the claw shorter than the blade; capsule oblong, 3′–4′ long, about 8″ thick; seeds like those of *L. Philadelphicum*.

In dry soil, Ohio to Minnesota and the Northwest Territory, south to Missouri, Arkansas and Colorado. Ascends to 4000 ft. in the Black Hills. June–July.

3. Lilium Catesbaèi Walt. Southern Red Lily. (Fig. 1005.)

Lilium Catesbaei Walt. Fl. Car. 123. 1788.

Bulb ½′–1′ high, composed of narrow leaf-bearing scales, their leaves narrowly linear, 2′–4′ long, often falling away before the plant flowers. Stem slender, 1°–2° high; stem leaves all alternate, narrowly linear or linear-lanceolate, acute or acuminate, erect or appressed, 1′–3′ long, 1″–3″ wide; flower (always?) solitary, erect; perianth-segments scarlet with a yellow purple-spotted base and a slender claw, spreading or somewhat recurved, 3′–5′ long, ½′–1′ wide, long-acuminate, wavy-margined; capsule 1′ high or less; seeds 2″–3″ long.

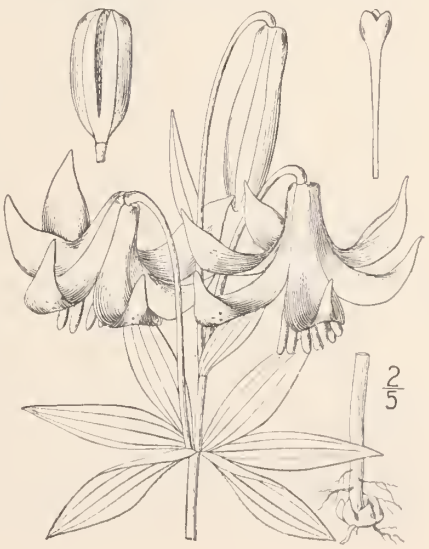
In moist pine barrens, North Carolina to Florida and Alabama. Reported from Kentucky and Missouri. July–Aug.

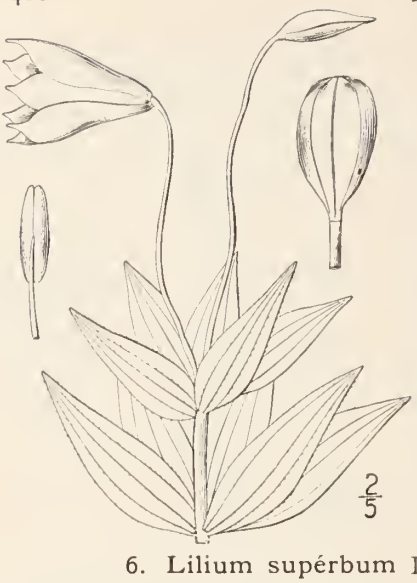
4. Lilium Canadénse L. Wild Yellow Lily. Canada Lily. (Fig. 1006.)

Lilium Canadense L. Sp. Pl. 303. 1753.

Bulbs subglobose, 1′–2′ in diameter, borne on a stout rootstock, composed of numerous thick white scales. Stem 2°–5° tall, slender or stout; leaves lanceolate or oblong-lanceolate, verticillate in 4's–10's or some of them alternate, acuminate, 2′–6′ long, 3″–15″ wide, finely roughened on the margins and on the veins beneath; flowers 1–16, nodding on long peduncles; peduncles sometimes bearing a small leaf-like bract; perianth-segments 2′–3′ long, yellow or red, usually thickly spotted below, recurved or spreading, not clawed; capsule oblong, erect, 1½′–2′ long.

In swamps, meadows and fields, Nova Scotia to Ontario and Minnesota, south to Georgia, Alabama and Missouri. Ascends to 6000 ft. in North Carolina. Red-flowered forms with slightly spreading perianth-segments resemble the following species, and forms with strongly recurved segments, *L. superbum*. June–July.





5. Lilium Gràyi S. Wats. Asa Gray's Lily. (Fig. 1007.)

Lilium Grayi S. Wats. Proc. Am. Acad. **14**: 256. 1879.

Rootstock bearing small subglobose bulbs with thick ovate scales. Stem slender, 2°–3° high; leaves oblong-lanceolate, acute or acuminate at the apex, narrowed at the base, 2′–4′ long, ½′–1′ wide, verticillate in 3's–8's or the lowest commonly smaller and scattered, all finely roughened on the veins beneath; flowers 1–3, long-pedunculed, spreading or slightly drooping, 2′–3′ long, red or tinged with yellow at the base; perianth-segments oblong-spatulate, not clawed, acute, spotted; capsule fig-shaped, about 1½′ high.

Peaks of Otter, Virginia, and on the higher mountain summits in North Carolina. July–Aug.

6. Lilium supérbum L. Turk's-cap Lily. (Fig. 1008.)

Lilium superbum L. Sp. Pl. Ed. 2, 434. 1762.

Bulbs globose, 1′–2′ in diameter, borne on short rootstocks, their scales white, thick, ovate. Stem stout or slender, 3°–8° high; leaves lanceolate or linear-lanceolate, smooth on both sides, acuminate at both ends, 2′–6′ long, ¼′–1½′ wide, verticillate in 3's–8's or the upper alternate, the veinlets not prominently anastomosing; flowers orange, orange-yellow or rarely red, 3–40, or rarely solitary, nodding, long-pedunculed, forming, when numerous, a large panicle; perianth-segments 2½′–4′ long, lanceolate, acuminate, purple-spotted, at length usually strongly recurved from below the middle; capsule obovoid, 1½′–2′ high.

In meadows and marshes, Maine to Ontario and Minnesota, south to North Carolina and Tennessee. Ascends to 5000 ft. in Virginia. July–Aug.

7. Lilium Caroliniànum Michx. Carolina Lily. (Fig. 1009.)

Lilium Carolinianum Michx. Fl. Bor. Am. 1: 197. 1803.

Lilium superbum var. *Carolinianum* Chapm. Fl. S. States, 484. 1860.

Bulbs borne on short rootstocks, globose, 1′–2′ in diameter, composed of numerous fleshy scales. Stem 2°–3° high, slender; leaves oblanceolate or obovate, smooth, verticillate or the upper and lower alternate, acute, obtuse or short-acuminate at the apex, narrowed at the base, the veinlets prominently anastomosing; flowers 1–3, orange-red, 3′–4′ long, long-peduncled, nodding; perianth-segments lanceolate, acuminate, purple-spotted below, strongly arched backward with their tips sometimes connivent.

In dry woods, Virginia to Florida and Louisiana. Ascends to 3500 ft. in Virginia. Aug.

8. Lilium tigrìnum Andr. Tiger Lily. (Fig. 1010.)

Lilium tigrinum Andr. Bot. Rep. 9: errata. 1809.

Bulb solitary, globose, about 1½′ in diameter, composed of numerous oblong-lanceolate, appressed scales. Stem stout, purple or nearly black, white-pubescent above, 2°–5° tall, leafy nearly to the base; leaves lanceolate, all alternate, glabrous or slightly pubescent, 4′–6′ long, 5″–10″ wide, the upper bearing blackish bulblets, of 3 or 4 scales, in their axils, which sometimes emit roots while attached to the plant; flowers 5–25, orange-red, nodding, 3′–4½′ long; perianth-segments lanceolate, papillose, recurved, purple-spotted.

Escaped from gardens, Maine and Massachusetts. Native of China and Japan. Summer.

7. FRITILLÀRIA L. Sp. Pl. 803. 1753.

Bulbous herbs with simple leafy stems, and rather large nodding solitary or racemed leafy-bracted flowers. Perianth mostly campanulate, deciduous, of 6 separate and nearly equal oblong or ovate segments, each with a nectar-pit or spot at the base. Stamens 6, hypogynous; filaments filiform or somewhat flattened; anthers linear or oblong. Ovary nearly or quite sessile, 3-celled; ovules numerous in each cavity; style slender or filiform, 3-lobed or 3-cleft, the lobes stigmatic along the inner side. Capsule obovoid or globose, 6-angled, loculicidally dehiscent. Seeds numerous, flat, obovate or suborbicular, margined or winged. [Latin, from *fritillus*, a dice-box or chess-board, in allusion to the form or to the checkered markings of the perianth in some species.]

About 50 species, natives of the north temperate zone. Besides the following, about 12 others occur in western North America.

1. Fritillaria atropurpùrea Nutt. Purple Fritillaria. (Fig. 1011.)

Fritillaria atropurpurea Nutt. Journ. Acad. Phila. 7: 54. 1834.

Bulb ½′ in diameter or less. Stem 6′–15′ high, slender, leafless below; leaves linear, alternate, sessile, 1½′–3½′ long, 1½″–2″ wide or less; flowers 1–6, purple or purplish green and mottled; perianth-segments narrowly oblong, obtusish, 6″–10″ long; peduncles ½′–1′ long; stamens one-half to two-thirds as long as the perianth; style 3-cleft to about the middle, the lobes linear; capsule erect, acutely angled, 5″–6″ high.

North Dakota to Nebraska, Wyoming and California. June–July.

8. ERYTHRÒNIUM L. Sp. Pl. 305. 1753.

Low herbs, from deep membranous-coated corms, sometimes propagated by offshoots, the stem simple, bearing a pair of broad or narrow unequal leaves, usually below the middle, the leaves thus appearing basal. Flowers large, nodding, bractless, solitary, or several in some western species. Many plants are flowerless and 1-leaved, these leaves often wider and longer petioled than those of the stem. Perianth-segments separate, lanceolate, oblong or oblanceolate, deciduous, with nectariferous groove, and sometimes 2 short processes at the

base. Stamens 6, hypogynous, shorter than the perianth; anthers linear oblong, not versatile. Ovary sessile, 3-celled; ovules numerous or several in each cavity; style filiform or thickened above, 3-lobed or 3-cleft. Capsule obovoid or oblong, somewhat 3-angled, loculicidal. Seeds compressed, or somewhat angled and swollen. [Greek, in allusion to the red flowers of some species.]

About 12 species, all but one North American. The species are erroneously called *Dog's-tooth Violet*.

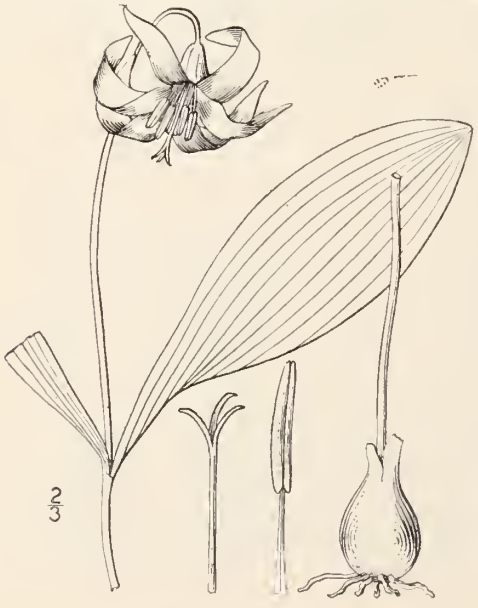
Stem with no offshoot; flowers 10″–2′ long.
Offshoots produced at the base of the corm; perianth-segments recurved.
Flowers yellow; stigmas very short. 1. *E. Americanum.*
Flowers white, blue or purple; stigmas 1″–1½″ long, recurved. 2. *E. albidum.*
No offshoots, propagating by basal corms; perianth-segments not recurved. 3. *E. mesachoreum.*
Stem with a fleshy offshoot below the leaves; flowers rose, about ½′ long. 4. *E. propullans.*

1. Erythronium Americànum Ker. Yellow Adder's-tongue. (Fig. 1012.)

Erythronium Americanum Ker, Bot. Mag. *pl. 1113.* 1 Je. 1808.
Erythronium angustatum Raf. Med. Rep. (II.) 5: 354. 20 Jl. 1808.
Erythronium bracteatum Bigel.; Beck, Bot. N. & Mid. States, 365. 1833.

Corm ovoid, 6″–10″ high, producing offshoots from its base. Stem ½°–1° long; leaves oblong or oblong-lanceolate, 3′–8′ long, ½′–2′ wide, acute or short-acuminate at the apex, flat, usually mottled with brown, but sometimes green all over, narrowed into clasping petioles; peduncle about as long as the leaves, rarely bearing a bract; flower yellow, or rarely purplish tinged; perianth-segments oblong, 10″–2′ long, 3″–4″ wide, recurved, dotted within, the 3 inner auricled at the base; style club-shaped, with 3 very short stigmatic ridges; capsule obovoid, contracted into a short stipe, 6″–10″ high; seeds curved, rounded on the back, about 1½″ long, pointed at both ends.

In moist woods and thickets, Nova Scotia to Ontario and Minnesota, south to Florida, Missouri and Arkansas. Ascends to 5500 ft. in Virginia. March–May.



2. Erythronium álbidum Nutt. White Adder's-tongue. (Fig. 1013.)

Erythronium albidum Nutt. Gen. 1: 223. 1818.

Similar to the preceding species, the plant propagating by offshoots from the base of the corm, the leaves mottled or green all over, sometimes rather narrower. Flower white, blue or purple; perianth-segments oblong, recurved, none of them auricled at the base; style somewhat thickened upward; stigmas linear, finally recurving, 1″–1½″ long; capsule obovoid or oblong, 5″–9″ high.

In moist woods and thickets, Ontario to Minnesota, south to Georgia, Tennessee and Texas. Not common eastward. March–May.

3. Erythronium mesachòreum Knerr. Midland Adder's-tongue. (Fig. 1014.)

Erythronium mesachoreum Knerr, Midland College Monthly, 2: 5. 1891.

Corm ovoid, 10″ high or less, not developing offshoots, the new corms formed at or within the base of the old one. Leaves narrowly oblong or linear-oblong, not mottled, 4′–10′ long, ¼′–1′ wide, somewhat folded; flower lavender tinted, 1′–2′ long; perianth-segments not recurved, sometimes a little spreading; style slender; stigmas recurved; capsule obovoid, larger than that of *E. albidum*, ½′–1½′ high.

On prairies, Iowa to Missouri, Nebraska and Kansas. Blooms before *E. albidum* when the two grow in proximity. The flowering plants are said to appear before the 1-leaved flowerless ones.

4. Erythronium propúllans A. Gray. Minnesota Adder's-tongue. (Fig. 1015.)

Erythronium propullans A. Gray, Am. Nat. 298. *pl. 74.* 1871.

Corm ovoid, 10″ high or less, not developing offshoots. Stem ascending, 6′–8′ long, bearing a fleshy curved offshoot 1′–2′ long from a slit near the base of the petiole-sheath; leaves oblong, acute, 2′–4′ long, slightly mottled or green; flower rose or pink, about ½′ long, borne on a filiform peduncle shorter than the leaves, perianth-segments with a yellow base, apparently not recurved, none of them auricled; stigmas mere ridges.

In rich woods, Minnesota. Also in southern Ontario (according to Macoun). May.

9. CALOCHÓRTUS Pursh, Fl. Am. Sept. 240. 1814.

Branched or simple herbs, with coated corms, narrowly linear leaves and large showy peduncled flowers, erect in the following species. Perianth-segments separate, spreading or connivent, yellow, blue, purple, white or variegated; the 3 outer sepal-like, narrow; the 3 inner petaloid, gland-bearing, and barbed or spotted within, sometimes with a nectar-pit near the base. Stamens 6, hypogynous; filaments short, subulate; anthers erect, linear or oblong. Ovary 3-celled; ovules numerous; style very short or none; stigmas 3, recurved. Capsule oblong or linear, 3-angled, mostly septicidal, the valves sometimes 2-cleft. Seeds flat. [Greek, signifying beautiful herb.]

About 35 species, natives of western North America and Mexico.

Anthers obtuse; gland of inner perianth-segments orbicular or oval. 1. *C. Nuttallii.*
Anthers acute; gland transverse, curved or reniform. 2. *C. Gunnisoni.*

1. Calochortus Nuttàllii T. & G. Nuttall's Mariposa Lily. (Fig. 1016.)

Fritillaria alba Nutt. Gen. 1: 222. 1818.?

Calochortus Nuttallii T. & G. Pac. R. R. Rep. 2: 124. 1855.

Corm ovoid-oblong, 6″–10″ high. Stem slender, few-leaved, branched or sometimes simple, 3′–15′ tall; leaves 1′–3′ long, 1″–2½″ wide, the lowest commonly bearing a bulb in its axil; peduncles 2′–6′ long; outer perianth-segments lanceolate or ovate-lanceolate, green with lighter margins, acute or acuminate, shorter than the inner, sometimes with a dark or hairy spot within; inner perianth-segments broadly obovate-cuneate, 1′–1½′ long, 10″–12″ wide, white, lilac or yellowish, with a yellow base and a purple or purplish spot, the gland orbicular or oval and more or less pubescent; filaments 3″–4″ long, about equalling the oblong obtuse sagittate anthers; capsule about 1½′ long, 3″–4″ thick, acuminate, the valves obliquely cross-lined.

South Dakota to Nebraska and California. June–July.

2. Calochortus Gunnisòni S. Wats. Gunnison's Mariposa Lily. (Fig. 1017.)

Calochortus Gunnisoni S. Wats. Bot. King's Exp. 348. 1871.

Stem slender, often simple, 6′–15′ high. Leaves usually less than 1″ wide, involute, at least when dry, none of the axils bulb-bearing in any specimen seen; peduncles 1′–4′ long; outer perianth-segments lanceolate or oblong-lanceolate, scarious-margined, acuminate; inner perianth-segments similar to those of the preceding species, lilac, yellowish below the middle, purple-lined and banded, the gland transverse, oblong, curved or reniform, pubescent; anthers acute; capsule narrowly oblong, narrowed at both ends, about 1¼′ long.

South Dakota and Nebraska to Arizona and New Mexico. June–July.

10. QUAMÀSIA Raf. Am. Month. Mag. 2: 265. 1818.

[Camassia Lindl. Bot. Reg. *pl. 1486.* 1832.]

Scapose herbs, with membranous-coated edible bulbs, linear basal leaves, and rather large, blue, purple or white bracted flowers in a terminal raceme. Perianth of 6 separate equal spreading persistent 3–7-nerved segments. Pedicels jointed at the base of the flower. Stamens inserted at the bases of the perianth-segments; filaments filiform; anthers oblong or linear-oblong, versatile, introrse. Ovary 3-celled, sessile; ovules numerous in each cavity; style filiform, its base persistent; stigma 3-lobed. Capsule oval, 3-angled, loculicidal. Seeds black, shining. [From quamash, the Indian name.]

About 4 species, natives of North America.

1. Quamasia hyacínthina (Raf.) Britton. Wild Hyacinth. (Fig. 1018.)

Lemotrys hyacinthina Raf. Fl. Tell. 3: 51. 1836.

Scilla Fraseri A. Gray, Man. Ed. 2, 469. 1856.

Camassia Fraseri Torr. Pac. R. R. Rep. 4: 147. 1857.

Bulb ovoid, 1′–1½′ long, its outer coat usually nearly black. Scape slender, 1°–2° tall, sometimes bearing 1 or 2 short linear scarious leaves; basal leaves narrowly linear, acuminate, shorter than the scape, 1½″–4″ wide; raceme open, 3′–8′ long in flower, longer in fruit; flowers several or many; pedicels filiform, 6″–10″ long, about as long as the bracts and the perianth-segments; bracts long-acuminate; perianth-segments narrowly oblong, 3–5-nerved, blue or nearly white, longer than the stamens; capsule about 4″ high, 5″–6″ thick, the valves transversely veined.

In meadows and along streams, Pennsylvania to Minnesota, Alabama and Texas. Ascends to 2100 ft. in Virginia. April–May.

11. ORNITHÓGALUM L. Sp. Pl. 306. 1753.

Scapose herbs, with coated bulbs, narrow basal fleshy leaves, and large white or yellow flowers in a terminal bracted corymb or raceme. Perianth-segments equal or nearly so, separate, white, or sometimes green without, persistent, faintly several-nerved. Stamens hypogynous; filaments flattened, often broad; anthers versatile, introrse. Ovary 3-celled, sessile; ovules several or numerous in each cavity; style short or columnar, 3-sided; stigma capitate, 3-lobed or 3-ridged. Capsule subglobose, 3-sided or 3-lobed, loculicidal. Seeds black. [Greek, signifying bird's milk, said to be in allusion to the egg-white color of the flowers in some species.]

About 75 species, natives of Europe, Asia and Africa.

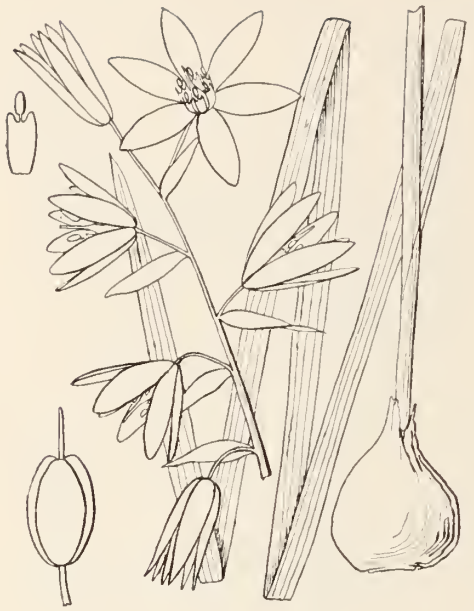
Flowers corymbose, erect; pedicels long, slender. 1. *O. umbellatum.*
Flowers racemose, drooping; pedicels very short, stout. 2. *O. nutans.*

1. Ornithogalum umbellàtum L. Star-of-Bethlehem. (Fig. 1019.)

Ornithogalum umbellatum L. Sp. Pl. 307. 1753.

Tufted, bulbs ovoid, ½′–1½′ long, the coats membranous. Scape slender, 4′–12′ high; leaves narrowly linear, 1″–2½″ wide, dark green with a light midvein, blunt, equalling or longer than the scapes; flowers corymbose, opening in sunshine; bracts membranous, linear-lanceolate, mostly shorter than the pedicels; pedicels erect or ascending, the lower 1′–3′ long; perianth-segments oblong-lanceolate, acute, white above, green with white margins beneath, 6″–10″ long, about twice as long as the stamens; filaments somewhat flattened, not toothed.

In fields and meadows, Massachusetts to Pennsylvania and Virginia. Locally very abundant. Naturalized from Europe. May–June.



2. Ornithogalum nùtans L. Drooping Star-of-Bethlehem. (Fig. 1020.)

Ornithogalum nutans L. Sp. Pl. 308. 1753.

Bulb ovoid, 1′–2′ long. Scape stout, 1°–2° high; leaves usually equalling the scape or longer, blunt, 2″–4″ wide; flowers several or numerous, racemose, nodding; raceme 3′–8′ long, loose; pedicels stout, 2″–6″ long; bracts lanceolate, long-acuminate, much longer than the pedicels, often as long as the flowers; perianth-segments thin, oblong-lanceolate, about 1′ long and 4″ wide, nearly twice as long as the stamens; filaments broad, flat, 2-toothed at the apex.

Escaped from gardens in eastern and southern Pennsylvania. Native of Europe. April–May. The bulbs of this and other species have for centuries past been a portion of the food of Italy, the Levant, and other parts of the Old World.

12. MUSCÀRI Mill. Gard. Dict. Ed. 7. 1759.

Low bulbous scapose herbs, with basal linear fleshy leaves, and nodding bracted racemose flowers, deep blue (rarely white) in the following species. Bulbs membranous-coated. Perianth globose, urn-shaped, or oblong, with 6 teeth or short lobes, tardily deciduous. Stamens 6, inserted on the perianth-tube, included; anthers ovate, versatile, introrse. Ovary 3-celled, sessile; ovules 2 in each cavity; style short; stigma 3-lobed. Capsule 3-sided or 3-winged, usually 6-seeded, loculicidal. Seeds black, angled. [From the musk-like odor of the flowers of some species.]

About 40 species, natives of Europe, Asia and Africa.

Perianth globose, 1″–1½″ in diameter; leaves erect. 1. *M. botryoides.*
Perianth oblong, urn-shaped, 2″–3″ long; leaves recurved. 2. *M. racemosum.*

1. Muscari botryoides (L.) Mill. Grape-Hyacinth. (Fig. 1021.)

Hyacinthus botryoides L. Sp. Pl. 318. 1753.

Muscari botryoides Mill. Gard. Dict. Ed. 8. no. 1. 1768.

Bulb 1′ high or less. Scape 4′–10′ high; leaves about as long as the scape, erect or nearly so, 1″–4″ wide, channeled, blunt or acutish; raceme oblong-cylindric, 1′–1½′ long, dense, or becoming longer and looser in fruit; pedicels shorter than the faintly odorous flowers; bracts very short; perianth globose, 1″–1½″ in diameter, 6-toothed, the teeth white, recurved; valve of the capsule obovate.

In meadows and thickets and along roadsides, escaped from gardens, Massachusetts to Ohio and Virginia. Naturalized or adventive from southern Europe. Native also of Asia. April–June.

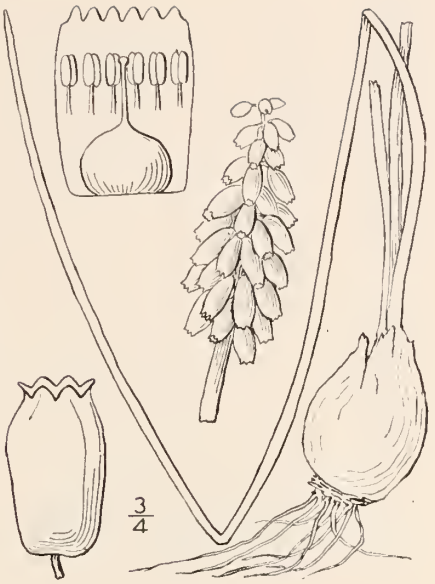
2. Muscari racemòsum (L.) Mill. Starch Grape-Hyacinth. (Fig. 1022.)

Hyacinthus racemosus L. Sp. Pl. 318. 1753.

Muscari racemosum Mill. Gard. Dict. Ed. 8, no. 2. 1768.

Similar to the preceding species. Leaves 1″–2″ wide, recurved or spreading, channelled above; raceme oblong or ovoid, many-flowered, dense, 1′–2½′ long; pedicels shorter than the starchy-scented flowers or sometimes equalling them, slender, much longer than the bracts; perianth oblong, urn-shaped, constricted at the throat, 2″–3″ long, with 6 deltoid recurved white teeth; capsule-valves suborbicular, retuse.

Escaped from gardens, southern New York to Pennsylvania and Maryland. Native of southern Europe. April–May.



13. ÁLETRIS L. Sp. Pl. 319. 1753.

Scapose perennial bitter fibrous-rooted herbs, with basal spreading lanceolate leaves, and small white or yellow bracted perfect flowers in a terminal spike-like raceme. Perianth oblong or campanulate, roughened without, 6-lobed, its lower part adnate to the ovary. Stamens 6, inserted on the perianth at the bases of the lobes, included; filaments short; anthers introrse. Ovary 3-celled; ovules numerous, anatropous; style subulate, or short, 3-cleft above; stigmas minutely 2-lobed. Capsule ovoid, enclosed by the persistent perianth, 3-celled, many-seeded, loculicidal. Seeds oblong, ribbed. Embryo small. Endosperm fleshy. [Greek, signifying to grind corn, apparently in allusion to the rough, mealy flowers.]

About 8 species, natives of eastern North America and eastern Asia.

Perianth white, oblong. 1. *A. farinosa.*
Perianth yellow, bell-shaped. 2. *A. aurea.*

1. Aletris farinòsa L. Star-grass. Colic-root. (Fig. 1023.)

Aletris farinosa L. Sp. Pl. 319. 1753.

Roots numerous, tough, scape 1½°–3° tall, slender, terete, striate, bearing several or numerous small distant bract-like leaves. Basal leaves several, lanceolate or linear-lanceolate, acuminate at the apex, narrowed to the base, spreading, pale yellowish green, 2′–6′ long, 3″–10″ wide; raceme 4′–12′ long in flower, or longer in fruit, dense, erect, pedicels 1″ long or less; bracts subulate, longer than the pedicels sometimes 2 to each flower; perianth tubular-oblong, white, or the oblong lobes yellowish, 3″–4″ long, about 1½″ thick; style subulate; capsule ovoid, about 2″ long, loculicidal above; each of its 3 valves tipped with a subulate portion of the style.

In dry, mostly sandy soil, Maine to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 3500 ft. in Virginia. Yellow-flowered forms of this or a distinct species occur in the Southern States. May–July.

2. Aletris àurea Walt. Yellow Colic-root. (Fig. 1024.)

Aletris aurea Walt. Fl. Car. 121. 1788.

Basal leaves shorter than those of the preceding species, 1½′–3′ long, 3″–8″ wide, acuminate, narrowed into short petioles. Scape 1°–2½° tall, bearing a few subulate bract-like leaves; raceme 8′–2° long, usually loose; pedicels 1″ long or less, shorter than the bracts; perianth bell-shaped or ovoid-globose, bright yellow, 2″–3″ long, 1½″–2″ in diameter, its lobes oval; style short; capsule ovoid, about as long as the perianth.

Southern New Jersey (according to Gray and to Rusby); Virginia to Florida and Texas. June–Aug.

14. YÚCCA L. Sp. Pl. 319. 1753.

Large plants, with a short sometimes subterranean caudex, or tall woody and leafy stem, or bracted scape, the leaves linear or lanceolate, usually rigid and sharp-pointed, bearing long marginal thread-like fibres in our species. Flowers large, bracted, nodding in a terminal raceme or panicle. Periauth campanulate, or nearly globular, white in our species, of 6 ovate, or ovate-lanceolate separate or slightly united segments. Stamens hypogynous, shorter than the perianth; filaments thickened above, often papillose; anthers small, versatile. Ovary sessile, 3-celled; or imperfectly 6-celled; ovules numerous; style columnar, short, with 3 stigmatic lobes. Fruit a loculicidal or septicidal capsule, or fleshy, or spongy and indehiscent. Seeds numerous, flattened, horizontal. [The Haytien name.]

About 16 species, natives of North and Central America.

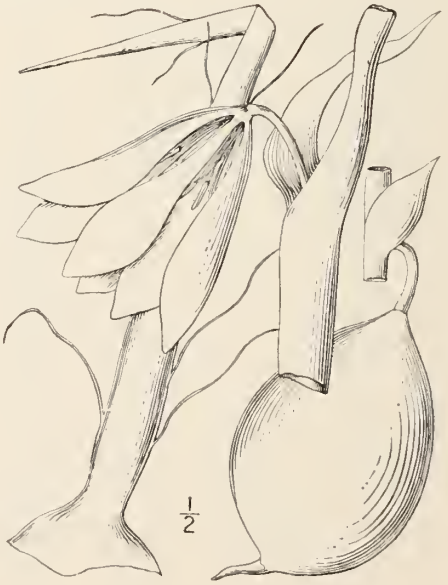
Fruit fleshy, indehiscent, drooping.	1. *Y. baccata.*
Fruit an erect capsule.	
Leaves 2″–5″ wide; scape short, bearing a long raceme.	2. *Y. glauca.*
Leaves 10″–2′ wide; scape 2°–10° high, bearing a large panicle.	3. *Y. filamentosa.*

1. Yucca baccàta Torr. Spanish Bayonet. (Fig. 1025.)

Yucca baccata Torr. Bot. Mex. Bound. Surv. 221. 1859.

Caudex very short, or sometimes 2°–8° tall, covered with the reflexed dead leaves. Leaves 1½°–3° long, 1′–2′ wide with a much wider base, acuminate, with a stout brown point, concave, the marginal fibres 2′–5′ long; panicle peduncled; pedicels stout, 8″–20″ long; flowers 4′–5′ broad; perianth-segments 2½′–3½′ long, 8″–12″ wide; style slender, as long as the ovary, or shorter; fruit oval, dark purple, fleshy, indehiscent, edible, drooping 2′–3′ long, 1½′–2′ in diameter, with a 6-grooved beak of one-half its length or less; seeds 3″ 8″ long, 1″–1½″ thick.

Western Kansas (?) southern Colorado to Texas, California and Mexico. April–June. Fruit ripe Sept.–Oct.



2. Yucca glaùca Nutt. Bear-grass. (Fig. 1026.)

Yucca glauca Nutt. Fraser's Cat. 1813.
Yucca angustifolia Pursh, Fl. Am. Sept. 227. 1814.

Caudex very short, the leaves all basal, narrowly linear, smooth, very stiff, sharp-pointed, 1°–3° long, 2″–5″ wide, with a broader base, concave, at least when dry, the marginal fibres filiform, usually numerous; scape short; flowers 1½′–3′ broad, racemose or in a little-branched panicle 1°–4° long; perianth-segments ovate, 1′–1½′ long; style short; stigmas shorter than the ovary; pedicels stout, erect and 1′–1½′ long in fruit; capsule oblong, 2′–3′ long, about 1′ thick, 6-sided; seeds very flat, about ½′ broad.

In dry soil, Iowa and South Dakota to Wyoming, south to Missouri, Texas and Arizona. May–June.

3. Yucca filamentòsa L. Adam's Needle. (Fig. 1027.)

Yucca filamentosa L. Sp. Pl. 319. 1753.

Caudex very short, or sometimes 1° high. Leaves lanceolate, narrowed above the broad base, acuminate and sharp-pointed, flat, roughish, 1°–2½° long, 9″–2′ wide; scape 2°–10° high; panicle large, its branches divergent or ascending, the lower often 1° long or more; flowers numerous; perianth-segments 1½′–2¼′ long, ovate; stigmas slender, but shorter than the ovary; pedicels rarely more than ½′ long; capsule oblong, 1½′–2′ long, about 10″ thick.

In sandy soil, Maryland to Florida, Tennessee and Louisiana. Much cultivated for ornament. Escaped from gardens in southern Pennsylvania. May–July.

Family 20. CONVALLARIÀCEAE Link. Handb. 1: 184. 1829.

Lily-of-the-Valley Family.

Scapose or leafy-stemmed herbs, with simple or branched rootstocks, never with bulbs or corms. Flowers solitary, racemose, panicled or umbelled, regular and perfect. Leaves broad, parallel-veined and sometimes with cross-veinlets, alternate, verticillate or basal, or in *Asparagus* and its allies reduced to scales bearing filiform or flattened branchlets in their axils. Perianth inferior 4–6-parted with separate segments, or oblong, cylindric or urn-shaped and 6-lobed or 6-toothed. Stamens 6, hypogynous or borne on the perianth; anthers introrsely, extrorsely or laterally dehiscent. Ovary 2–3-celled, superior; ovules anatropous or amphitropous; style slender or short; stigma mostly 3-lobed. Fruit a fleshy berry. Seeds few or numerous. Embryo small. Endosperm copious.

About 23 genera and 215 species, widely distributed.

Leaves reduced to scales; leaf-like branchlets filiform. — 1. *Asparagus.*
Leaves broad; stems simple or somewhat branched.
  Leaves alternate or basal.
    Leaves basal; flowers umbelled or solitary. — 2. *Clintonia.*
    Leaves alternate (solitary in flowerless plants of no. 4).
      Perianth-segments separate.
        Flowers racemed, umbelled, panicled or solitary, terminal.
          Flowers racemed or panicled.
            Perianth-segments 6. — 3. *Vagnera.*
            Perianth-segments 4. — 4. *Unifolium.*
          Flowers umbelled or solitary. — 5. *Disporum.*
        Flowers solitary or two together, axillary. — 6. *Streptopus.*
      Perianth cylindric or oblong, 6-toothed. — 7. *Polygonatum.*
  Leaves nearly basal; flowers racemed; perianth 6-toothed. — 8. *Convallaria.*

Leaves in 1 or 2 whorls below the flower or flowers.
Leaves in 2 whorls; flowers umbelled. 9. *Medeola.*
Leaves in 1 whorl; flowers solitary. 10. *Trillium.*

1. ASPÁRAGUS L. Sp. Pl. 313. 1753.

Stem at first simple, fleshy, scaly, at length much branched; the branchlets filiform and mostly clustered in the axils of the scales in the following species, flattened and linear, lanceolate or ovate in some others. Flowers small, solitary, umbelled or racemed. Perianth-segments alike, separate or slightly united at the base. Stamens inserted at the bases of the perianth-segments; filaments mostly filiform; anthers ovate or oblong, introrse. Ovary sessile, 3-celled; ovules 2 in each cavity; style slender, short; stigmas 3, short, recurved. Berry globose. Seeds few, rounded. [Ancient Greek name.]

About 100 species, natives of the Old World.

1. Asparagus officinàlis L. Asparagus. (Fig. 1028.)

Asparagus officinalis L. Sp. Pl. 313. 1753.

Rootstock much branched. Young stems succulent, edible, stout, later branching, and becoming 3°–7° tall, the filiform branchlets 3″–9″ long, less than ¼″ thick, mostly clustered in the axils of minute scales. Flowers mostly solitary at the nodes, green, drooping on filiform jointed peduncles; perianth campanulate, about 3″ long, the segments linear, obtuse; stamens shorter than the perianth; berry red, about 4″ in diameter.

Escaped from cultivation and naturalized, especially along salt marshes, New Brunswick to Virginia, and locally in waste places in the interior. Native of Europe. May–June, or flowering also in the autumn.

2. CLINTÒNIA Raf. Journ. Pys. 89: 102. 1819.

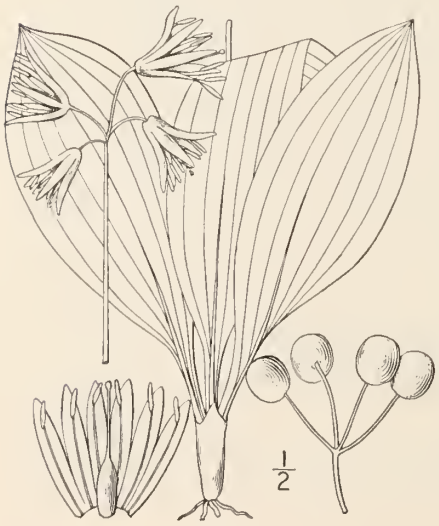
Somewhat pubescent scapose herbs, with slender rootstocks, erect simple scapes, and few broad petioled sheathing basal leaves, the bractless flowers umbelled at the summit of the scape in our species. Perianth-segments distinct, equal or nearly so, erect-spreading. Stamens 6, inserted at the bases of the perianth-segments; filaments filiform; anthers oblong, laterally dehiscent. Ovary 2–3-celled; ovules 2–several in each cavity; style stout or slender; stigma obscurely 2–3-lobed. Berry globose or oval. [Name in honor of De Witt Clinton, 1769–1828, American naturalist, Governor of the State of New York.]

Six species, the following of eastern North America, 2 of western North America, 2 Asiatic.

Flowers greenish-yellow, drooping, 8″–10″ long; berry blue. 1. *C. borealis.*
Flowers white, not drooping, 4″–5″ long; berry black. 2. *C. umbellulata.*

1. Clintonia boreàlis (Ait.) Raf. Yellow Clintonia. (Fig. 1029.)

Dracaena borealis Ait. Hort. Kew. 1: 454. 1789.
Clintonia borealis Raf. Atl. Journ. 120. 1832.



Scape 6′–15′ high, pubescent above or nearly glabrous. Leaves 2–5, usually 3, oval, oblong or obovate, thin, shorter than the scape, 1½′–3½′ wide, ciliate, short-acuminate or cuspidate; umbel 3–6-flowered; flowers drooping, greenish yellow, 8″–10″ long; pedicels 3″–15″ long, slender, pubescent, erect or ascending in fruit; perianth-segments obtuse or acutish; stamens about as long as the perianth; ovary 2-celled; ovules numerous, in 2 rows in each cavity, style slender, somewhat thickened above, about equalling the stamens; berry oval, blue, several-seeded, about 4″ in diameter.

In moist woods and thickets, Newfoundland to Ontario and Minnesota, south to North Carolina and Wisconsin. Ascends to 4500 ft. in Virginia. A flower is occasionally borne on the scape below the umbel, and rarely a small leaf. May–June.

2. Clintonia umbellulàta (Michx.) Torr. White Clintonia. (Fig. 1030.)

Dracaena umbellulata Michx. Fl. Bor. Am. 1: 202. 1803.
Clintonia ciliata Raf. Journ. Phys. 89: 102. 1819.
C. umbellata Torr. Fl. N. Y. 2: 301. 1843.

Scape more or less pubescent, 8′–18′ high, sometimes bearing a small leaf. Leaves 2–5, oblong, oblanceolate or obovate, shorter than the scape or equalling it, acute or cuspidate, ciliate on the margins and sometimes also on the midvein beneath, 1½′–4′ wide; umbel several–many-flowered; pedicels ascending or erect, slender, pubescent, at first short, becoming ½′–1½′ long in fruit; flowers white, odorous, often purplish dotted, 4″–5″ long; perianth-segments obtusish; ovary 2-celled; ovules 2 in each cavity; style slender; berry globose, black, about 3″ in diameter, few-seeded.

In woods, New York and New Jersey to Georgia and Tennessee. Ascends to 4000 ft. in Virginia. May–June.

3. VÀGNERA Adans. Fam. Pl. 2: 496. 1763.

[Smilacina Desf. Ann. Mus. Paris, 9: 51. 1807.]

Rootstocks slender, or short and thick. Stem simple, scaly below, leafy above, the leaves alternate, short-petioled or sessile ovate, lanceolate or oblong. Inflorescence a terminal raceme or panicle. Flowers white or greenish white, small. Perianth of 6 separate spreading equal segments. Stamens 6, inserted at the bases of the perianth-segments; filaments filiform or slightly flattened; anthers ovate, introrse. Ovary 3-celled, sessile, subglobose; ovules 2 in each cavity; style short or slender, columnar; stigma 3-grooved or 3-lobed. Berry globular. Seeds usually 1 or 2, subglobose. [Named in honor of Wagner.]

About 25 species, natives of North America, Central America and Asia. Besides the following, one or two others occur in the western United States.

Flowers numerous, panicled. 1. *V. racemosa.*
Flowers few-several, racemose.
  Plant 10′–18′ high; leaves numerous. 2. *V. stellata.*
  Plant 2′–15′ high; leaves 2–4. 3. *V. trifolia.*

1. Vagnera racemòsa (L.) Morong. Wild Spikenard. (Fig. 1031.)

Convallaria racemosa L. Sp. Pl. 315. 1753.
Smilacina racemosa Desf. Ann. Mus. Paris, 9: 51. 1807.
Vagnera racemosa Morong, Mem. Torr. Club, 5: 114. 1894.

Rootstock rather thick, fleshy. Stem somewhat angled, slender or stout, erect or ascending, leafy, finely pubescent above, or nearly glabrous, sometimes zigzag, 1°–3° high. Leaves oblong-lanceolate or oval, sessile or the lower short-petioled, 3′–6′ long, 1′–3′ wide, acuminate, finely pubescent beneath and sometimes also above, their margins minutely ciliate; panicle densely many-flowered, 1′–4′ long, peduncled; pedicels shorter than the flowers, or equalling them; flowers about 2″ broad; perianth-segments oblong, equalling the ovary; berry red, aromatic, speckled with purple, 2″–3″ in diameter.

In moist woods and thickets, Nova Scotia to British Columbia, south to Georgia, Missouri and Arizona. Ascends to 2500 ft. in Virginia. May–July.

Vagnera amplexicaùlis (Nutt.) Greene, of western North America, distinguished from this by its clasping leaves and longer style, may occur in western Nebraska.

2. Vagnera stellàta (L.) Morong. Star-flowered Solomon's Seal. (Fig. 1032.)

Convallaria stellata L. Sp. Pl. 316. 1753.
Smilacina stellata Desf. Ann. Mus. Paris, 9: 52. 1807.
Vagnera stellata Morong, Mem. Torr. Club, 5: 114. 1894.

Rootstock stout, fleshy. Stem rather stout, erect, glabrous, 8′–20′ tall, straight or somewhat zigzag, leafy. Leaves oblong-lanceolate or lanceolate, sessile and somewhat clasping, minutely pubescent beneath, 2′–5′ long, ½′–1½′ wide, acute, acuminate, or blunt at the apex, flat or somewhat concave; raceme sessile or short-peduncled, 1′–2′ long, several-flowered; pedicels 1″–4″ long, usually shorter than the flowers; perianth-segments oblong, obtuse, longer than the stamens; style about as long as the ovary; berry green with 6 black stripes or black, 3″–5″ in diameter.

In moist soil, Newfoundland to British Columbia, south to New Jersey, Virginia, Kentucky, Kansas and California. Also in northern Europe. May–June.

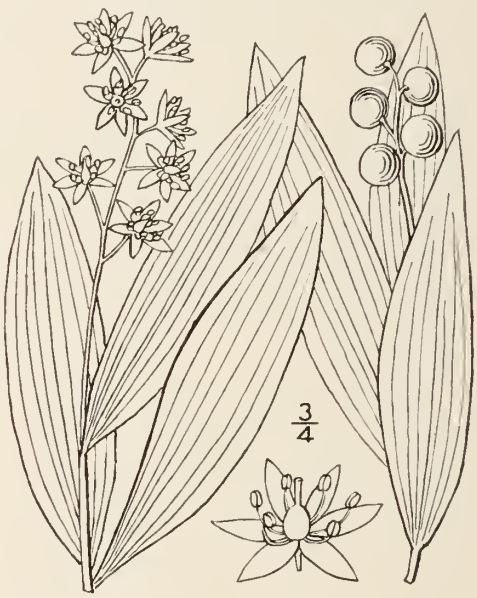
Unifolium liliàceum Greene, Pittonia, 1: 280, a related plant with conspicuously folded leaves and longer pedicels, of western North America, from the Black Hills to the Pacific Coast, may be distinct from this species.

3. Vagnera trifòlia (L.) Morong. Three-leaved Solomon's Seal. (Fig. 1033.)

Convallaria trifolia L. Sp. Pl. 316. 1753.
Smilacina trifolia Desf. Ann. Mus. Paris, 9: 52. 1807.
Vagnera trifolia Morong, Mem. Torr. Club, 5: 114. 1894.

Glabrous, rootstock slender. Stem slender, erect, 2′–15′ high, 2–4-leaved (usually 3-leaved); leaves oval, oblong or oblong-lanceolate, sessile, sheathing, 2′–5′ long, ½′–2′ wide, acute or acuminate at the apex, narrowed at the base; raceme few-flowered, peduncled, 1′–2′ long; perianth-segments oblong or oblong-lanceolate, obtuse, finally somewhat reflexed, longer than the stamens; style about as long as the ovary; berry dark red, 2½″–3″ in diameter.

In bogs and wet woods, Newfoundland to British Columbia, south to Connecticut, New Jersey, Pennsylvania and Michigan. Also in northern Asia. May–June.



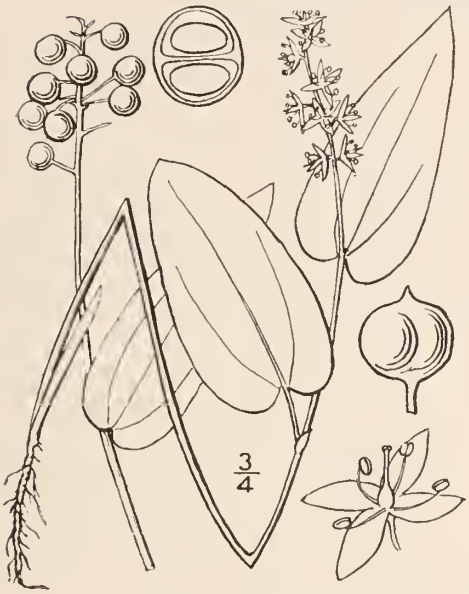
4. UNIFÒLIUM Adans. Fam. Pl. 2: 54. 1763.

[MAIANTHEMUM Wigg. Prim. Fl. Hols. 14. 1780.]

Low herbs, with slender rootstocks, erect simple few-leaved stems, petioled or sessile leaves and small white flowers in a terminal raceme, the pedicels commonly 2–3 together. Perianth of 4 separate spreading segments. Stamens 4, inserted at the bases of the segments; filaments filiform; anthers introrse. Ovary sessile, globose, 2-celled; ovules 2 in each cavity; style about as long as the ovary, 2-lobed or 2-cleft. Berry globular, 1–2-seeded. [Many plants bear only a solitary long-petioled leaf, arising from the rootstock, whence the Latin name.]

Two known species, the following of eastern North America, the other of Europe, Asia and northwest America.

1. **Unifolium Canadénse** (Desf.) Greene. False Lily-of-the-valley. Two-leaved Solomon's Seal. (Fig. 1034.)



Maianthemum Canadense Desf. Ann. Mus. Paris, 9: 54. 1807.
Smilacina bifolia var. *Canadensis* A. Gray, Man. Ed. 2, 467. 1856.
Unifolium Canadense Greene, Bull. Torr. Club, 15: 287. 1888.

Glabrous or pubescent. Stem slender, erect, often zigzag, 1–3-leaved (usually 2-leaved), 2′–7′ high; leaves ovate or ovate-lanceolate, 1′–3′ long, acute, acuminate, or blunt and cuspidate at the apex, cordate at the base with a narrow or closed sinus, sessile, short-petioled, or the lowest sometimes with a petiole ½′ long; solitary leaves of the stemless plants on petioles 1′–4′ long; raceme rather dense, many-flowered, 1′–2′ long; pedicels mostly longer than the flowers; perianth-segments oblong, obtuse, becoming reflexed, about 1″ long, rather longer than the stamens; berry pale red, speckled, about 2″ in diameter.

In moist woods and thickets, Newfoundland to the Northwest Territory, south to North Carolina, Iowa and South Dakota. Ascends to 5000 ft. in Virginia. May–July.

5. **DÍSPORUM** Salisb. Trans. Hort. Soc. 1: 331. 1812.

[Prosartes Don, Ann. Nat. Hist. 4: 341. 1840.]

More or less pubescent herbs with slender rootstocks, branching stems, scaly below, leafy above, and alternate somewhat inequilateral sessile or clasping leaves, the flowers terminal, drooping, whitish or greenish yellow, solitary or few in simple umbels. Perianth of 6 narrow equal separate deciduous segments. Stamens 6, hypogynous; filaments filiform or somewhat flattened, longer than the anthers; anthers oblong, or linear, extrorse. Ovary 3-celled; ovules 2 or sometimes several in each cavity; style slender; stigma 3-cleft or entire. Berry ovoid or oval, obtuse. [Greek, referring to the 2 ovules in each cavity of the ovary, in most species.]

About 15 species, natives of North America and Asia. Besides the following, some 5 others occur in western North America.

Stamens shorter than the perianth; fruit smooth, 2–6-seeded. 1. *D. lanuginosum.*
Stamens as long as the perianth; fruit roughened, 4–18-seeded. 2. *D. trachycarpum.*

1. **Disporum lanuginòsum** (Michx.) Nichols. Hairy Disporum. (Fig. 1035.)

Streptopus lanuginosus Michx. Fl. Bor. Am. 1: 201. 1803.
Prosartes lanuginosa Don, Trans. Linn. Soc. 18: 532. 1841.
Disporum lanuginosum Nichols. Dict. Gard. 1: 485. 1884.

Finely and rather densely pubescent, 1½°–2½° high. Leaves ovate lanceolate, or oblong-lanceolate, 2′–4½′ long, 1′–2′ wide, long-acuminate at the apex, rounded at the base, 7–15-nerved; flowers solitary or 2–3 together, greenish, 6″–9″ long; pedicels filiform, about 1′ long; perianth narrowly campanulate, its segments linear-lanceolate, acuminate, somewhat spreading, glabrous, one-third to one-half longer than the stamens; ovary oblong; style slender, longer than the stamens or equalling them, 3-cleft; berry oval, red, pulpy, 2–6-seeded, 5″–7″ long.

In woods, Ontario to western New York, Georgia and Tennessee. Ascends to 4000 ft. in Virginia. May–June.

2. Disporum trachycàrpum (S. Wats.) B. & H. Rough-fruited Disporum. (Fig. 1036.)

Prosartes trachycarpa S. Wats. Bot. King's Exp. 344. 1871.

Disporum trachycarpum B. & H. Gen. Pl. 3: 832. 1883.

Puberulent, at least when young, 1°–2° high. Leaves ovate, oval or oblong-lanceolate, 1½′–3½′ long, 1′–2½′ wide, acute or short-acuminate at the apex, rounded or subcordate at the base, 5–11-nerved; flowers solitary or 2–3 together, yellowish-white, 4″–7″ long; pedicels ½′–1′ long; perianth narrowly campanulate, its segments narrowly oblong or oblanceolate, acute, little spreading, about equalling the stamens, ovary depressed-globose; style slender, about equalling the stamens, 3-lobed; berry roughened, depressed-globose or somewhat obovoid, 4″–5″ in diameter, apparently leathery rather than pulpy, 4–18-seeded.

Manitoba and the Northwest Territory to South Dakota, Nebraska, Washington and Arizona. May–Aug.

6. STRÉPTOPUS Michx. Fl. Bor. Am. 1: 200. 1803.

Branching herbs, with stout or slender rootstocks, thin sessile or clasping alternate many-nerved leaves, the flowers solitary or 2 together, extra-axillary, slender-peduncled, greenish or purplish, small, nodding. Peduncles bent or twisted at about the middle. Perianth somewhat campanulate, its 6 separate segments recurved or spreading, deciduous, the outer flat, the inner keeled. Stamens 6, hypogynous; filaments short, flattened; anthers sagittate, extrorse. Ovary 3-celled; ovules numerous in 2 rows in each cavity; style slender, 3-cleft, 3-lobed or entire. Berry globose or oval, red, many-seeded. [Greek, twisted-stalk, in reference to the bent or twisted peduncles.]

About 5 species, natives of the north temperate zone. Besides the following, another occurs on the Pacific Coast.

Leaves glaucous beneath, clasping; flowers greenish-white. 1. *S. amplexifolius.*
Leaves green on both sides, sessile; flowers purple or rose. 2. *S. roseus.*

1. Streptopus amplexifòlius (L.) DC. Clasping-leaved Twisted-stalk. (Fig. 1037.)

Uvularia amplexifolia L. Sp. Pl. 304. 1753.

Streptopus amplexifolius DC. Fl. France, 3: 174. 1805.

Rootstock short, stout, horizontal, covered with thick fibrous roots. Plant 1½°–3° high; stem glabrous, usually branching below the middle, leaves 2′–5′ long, 1′–2′ wide, acuminate at the apex, cordate-clasping at the base, glabrous, glaucous beneath; peduncles 1′–2′ long, 1–2-flowered; flowers greenish white, 4″–6″ long; perianth-segments narrowly lanceolate, acuminate; anthers subulate-pointed; stigma simple, obtuse or truncate; berry oval, 5″–8″ long.

In moist woods, Labrador to Alaska, south to North Carolina, Ohio, Michigan and New Mexico. Ascends to 4000 ft. in the Adirondacks. May–July.

2. Streptopus ròseus Michx. Sessile-leaved Twisted-stalk. (Fig. 1038.)

Streptopus roseus Michx. Fl. Bor. Am. 1: 201. 1803.

Plant 1°–2½° high, from a short stout rootstock covered with fibrous roots. Branches sparingly pubescent; leaves 2′–4½′ long, acuminate at the apex, sessile, rounded, or slightly clasping at the base, green on both sides, their margins finely ciliate; peduncles ½′–1′ long, usually pubescent, 1-flowered, rarely 2-flowered; flowers purple or rose, 4″–6″ long; perianth-segments lanceolate, acuminate; anthers 2-horned; style 3-cleft, the spreading branches stigmatic along the inner side; berry globose or oval, 5″–6″ in diameter.

In moist woods, Labrador to Alaska, Georgia, Michigan and Oregon. Ascends to 5600 ft. in Virginia. May–July.

7. POLYGONÀTUM Adans. Fam. Pl. 2: 54. 1763.

Glabrous or pubescent herbs, with thick, horizontal jointed and scarred rootstocks, simple arching or erect stems, scaly below, leafy above, the leaves ovate or lanceolate, sessile and alternate in our species (opposite or verticillate in some exotic ones). Flowers greenish or pinkish, axillary, drooping, peduncled, solitary or 2–10 in an umbel, the pedicels jointed at the base of the flower. Perianth tubular or oblong-cylindric or somewhat expanded above the base, 6-lobed, the short lobes not spreading. Stamens 6, included; filaments adnate to the perianth for half their length or more; anthers sagittate, introrse. Ovary 3-celled; ovules 2–6 in each cavity; style slender; stigma small, capitate or slightly 3-lobed. Berry globular, pulpy, dark blue or nearly black, with a bloom, in our species. [Greek, in allusion to the jointed rootstocks].

About 20 species, natives of the north temperate zone.

Leaves pubescent beneath; filaments filiform, roughened.	1. *P. biflorum.*
Plant glabrous throughout; filaments smooth, somewhat flattened.	2. *P. commutatum.*

1. Polygonatum biflòrum (Walt.) Ell. Hairy Solomon's Seal. (Fig. 1039.)

Convallaria biflora Walt. Fl. Car. 122. 1788.

Polygonatum biflorum Ell. Bot. S. C. & Ga. 1: 393. 1817.

Stem slender, glabrous, often zigzag above, 8′–3° high. Leaves lanceolate, oval or ovate, 2′–4′ long, ½′–2′ wide, acute or acuminate at the apex, narrowed or sometimes obtuse at the base, pubescent especially on the veins and pale beneath, glabrous above, the upper commonly narrower than the lower; peduncles 1–4-flowered (often 2-flowered), glabrous; perianth 4″–6″ long, about 1½″ thick, filaments filiform, adnate to the perianth for about three-fourths its length, papillose-roughened; berry 3″–4″ in diameter.

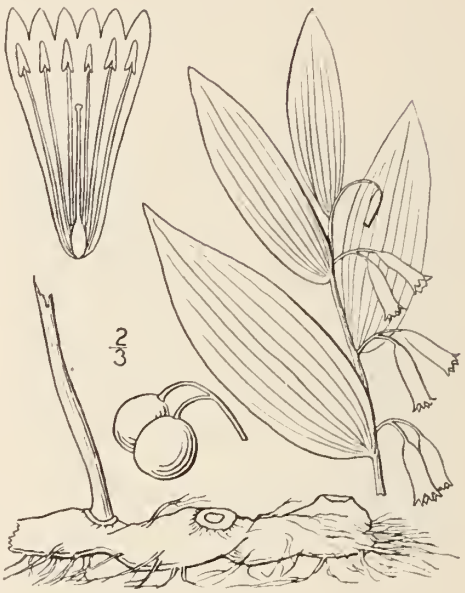
In woods and thickets, New Brunswick to Ontario and Michigan, south to Florida and West Virginia. April–July.

2. Polygonatum commutàtum (R. & S.) Dietr. Smooth Solomon's Seal. (Fig. 1040.)

Convallaria commutata R. & S. Syst. 7: 1671. 1830.

Polygonatum commutatum Dietr.; Otto & Dietr. Gartenz. 3: 223. 1835.

Polygonatum giganteum Dietr.; Otto & Dietr. Gartenz. 3: 222. 1835.



Glabrous throughout, stem stout or slender, 1°–8° high. Leaves lanceolate, oval or ovate, 1½′–6′ long, 3′–4′ wide, rather darker green above than beneath, acute, acuminate or blunt at the apex, narrowed, rounded or somewhat clasping at the base, the upper often narrower than the lower; peduncles 1–8-flowered, glabrous; perianth 6″–10″ long, 1½″–2″ thick; filaments somewhat flattened, smooth, adnate to the perianth for half its length or more; berry 4″–6″ in diameter.

In moist woods and along streams, rarely in dry soil, Rhode Island to Ontario and Manitoba, south to Georgia, Louisiana, Utah and New Mexico. Variable in size and in leaf-form. May–July.

8. CONVALLÀRIA L. Sp. Pl. 314. 1753.

A low glabrous herb, with horizontal rootstocks, very numerous fibrous roots, and 2 or sometimes 3 erect broad leaves, narrowed into sheathing petioles, the lower part of the stem bearing several sheathing scales. Flowers white, racemed, fragrant, nodding. Raceme 1-sided. Perianth globose-campanulate, 6 lobed, deciduous, the short lobes recurved. Stamens 6, included; filaments short, adnate to the lower part of the perianth; anthers oblong, introrse. Ovary 3-celled; ovules several in each cavity; style slender, 3-grooved; stigma small, capitate, slightly 3-lobed. Berry globose, pulpy. [Latin from *Convallis*, valley, and the Greek for lily.]

A monotypic genus of Europe, Asia and the higher Alleghenies.

1. Convallaria majàlis L. Lily-of-the-valley. (Fig. 1041.)

Convallaria majalis L. Sp. Pl. 314. 1753.

Stem 4′–9′ high. Leaves oblong, or oval, appearing nearly basal, acute at both ends, 5′–12′ long, 1′–2½′ wide; basal scales large, 1′–4′ long, one of them subtending an erect angled scape shorter than the leaves; raceme 1′–3½′ long, loosely several-flowered; pedicels filiform, recurved, 3″–6″ long, exceeding or sometimes shorter than the lanceolate bracts; perianth 3″–4″ long, its lobes 1″ long or less; filaments shorter than the anthers; berry about 3″ in diameter.

On the higher mountains of Virginia, North Carolina and South Carolina. Common in cultivation. May–June.

9. MEDÈOLA L. Sp. Pl. 339. 1753.

A slender erect unbranched herb, loosely provided with deciduous wool. Rootstock thick, white, tuber-like, with somewhat the odor and taste of cucumbers, the slender fibrous roots numerous. Leaves of flowering plants in 2 whorls; lower whorl of 5–9 oblong-lanceolate or obovate leaves; upper whorl of 3–5 ovate or oval leaves, subtending, like an involucre, the sessile umbel of small greenish yellow declined flowers. Perianth of 6 separate equal oblong recurved segments. Stamens 6, hypogynous; filaments slender, smooth, longer than the oblong extrorse anthers, the sacs laterally dehiscent. Ovary 3-celled; ovules several in each cavity; styles 3, recurved, stigmatic along the inner side. Berry globose, pulpy. [Name from *Medea*, a sorceress, referring to the supposed healing properties.]

A monotypic genus of eastern North America.

1. Medeola Virginiàna L. Indian Cucumber-root. (Fig. 1042.)

Medeola Virginiana L. Sp. Pl. 339. 1753.

Rootstock fleshy, 1′–3′ long. Stem 1°–2½° tall, bearing the lower whorl of leaves above the middle, or in flowerless plants at the summit; leaves of the lower whorl sessile, 2½′–5′ long, 1′–2′ wide, acuminate at the apex, narrowed at the base, 3–5-nerved and reticulate-veined; leaves of the upper whorl 1′–2′ long, ½′–1′ wide, short-petioled or sessile; umbel 2–9-flowered; pedicels filiform, 1′ long or less, declined in flower, erect or ascending in fruit; perianth-segments 3″–5″ long, obtuse; berry dark purple, 4″–7″ in diameter.

In moist woods and thickets, Nova Scotia to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 2800 ft. in Virginia. May–June.

10. TRÍLLIUM L. Sp. Pl. 339. 1753.

Glabrous erect unbranched herbs, with short scarred rootstocks and 3 leaves whorled at the summit of the stem, subtending the sessile or peduncled solitary bractless flower. Solitary long-petioled leaves are sometimes borne on the rootstock. Perianth of 2 distinct series of segments, the outer 3 (sepals) green, persistent, the inner 3 (petals) white, pink, purple or sometimes greenish, deciduous or withering. Stamens 6, hypogynous; filaments short; anthers linear, mostly introrse. Ovary sessile, 3–6-angled or lobed, 3-celled; ovules several or numerous in each cavity; styles 3, stigmatic along the inner side. Berry globose or ovoid, many-seeded. Seeds horizontal. [Latin, in allusion to the 3-parted flowers and the 3 leaves.]

About 20 species, natives of North America and Asia. Besides the following, some 7 others occur in the southern and western parts of North America. The species are known as *Three-leaved Nightshade* and *Birthroot*. Phyllody, *i. e.*, the reversion of petals or sepals to leaves, is occasional in the genus, and the floral parts are sometimes in 4's instead of 3's.

Flower sessile.
- Leaves sessile; sepals not reflexed. — 1. *T. sessile.*
- Leaves petioled; sepals reflexed. — 2. *T. recurvatum.*

Flower peduncled.
- Leaves oval or ovate, obtuse or obtusish, 1′–2′ long. — 3. *T. nivale.*
- Leaves broadly ovate or rhombic, acuminate, 2′–7′ long.
  - Leaves sessile, or narrowed at the base and short-petioled.
    - Petals obovate or oblanceolate, 1½′–2½′ long. — 4. *T. grandiflorum.*
    - Petals ovate or lanceolate, ½′–1½′ long.
      - Peduncle 1¼′–4′ long, erect or declined; petals spreading. — 5. *T. erectum.*
      - Peduncle 1¼′ long or less, recurved beneath the leaves; petals recurved. — 6. *T. cernuum.*
  - Leaves distinctly petioled, obtuse or rounded at the base. — 7. *T. undulatum.*

1. Trillium séssile L. Sessile-flowered Wake-robin. (Fig. 1043.)

Trillium sessile L. Sp. Pl. 340. 1753.

Stem 4′–12′ tall. Leaves ovate, oval or nearly orbicular, sessile, acute or obtuse and cuspidate at the apex, 1½′–6′ long, often blotched; flower sessile, erect; sepals lanceolate, acute or obtuse, spreading, ½′–2′ long, petals lanceolate, acute or obtuse, somewhat longer than the sepals, erect-speading, purple or green; anthers 3″–7″ long, longer than filament, the connective prolonged beyond the sacs; berry globose, 6-angled, about ½′ in diameter.

In moist woods and thickets, Pennsylvania to Ohio and Minnesota, south to Florida, Mississippi and Arkansas. Flowers pleasantly odorous. April–May.

2. Trillium recurvàtum Beck. Prairie Wake-robin. (Fig. 1044.)

Trillium recurvatum Beck, Am. Journ. Sci. 11: 178. 1826.

Stem 6′–18′ tall. Leaves ovate, oval or oblong, 1½′–4′ long, acute at the apex, narrowed into petioles 3″–9″ long, sometimes blotched; flower sessile, erect; sepals lanceolate, acuminate, 6″–15″ long, reflexed between the petioles; petals spatulate or oblong, nearly erect, clawed, acute or acuminate, equalling the sepals or somewhat longer; anthers 4″–7″ long, much longer than the filaments, the connective prolonged beyond the sacs; berry ovoid, 6-winged above, about 9″ long.

In woods and thickets, Ohio to Minnesota, Mississippi and Arkansas. April–June.

3. Trillium nivàle Riddell. Early Wake-robin. (Fig. 1045.)

Trillium nivale Riddell, Syn. Fl. W. States, 93. 1835.

Stem 2′–6′ high. Leaves ovate, oval or nearly orbicular, 1′–2′ long, obtuse at the apex, rounded or narrowed at the base, petioled; petioles, 2″–6″ long; flowers peduncled; peduncle ½′–1′ long, erect, bent, or recurved beneath the leaves; sepals narrowly oblong or oblong-lanceolate, obtuse, ½′–1′ long; petals white, oblong or oval, obtuse, longer than the sepals, erect-spreading; anthers about as long as the filaments, the connective not prolonged beyond the sacs; styles slender; berry globose, 3-lobed, about ½′ in diameter.

In woods and thickets, Pennsylvania to Ohio and Minnesota, south to Kentucky and Iowa. March May.

4. Trillium grandiflòrum (Michx.) Salisb. Large-flowered Wake-robin. (Fig. 1046.)

Trillium rhomboideum var. *grandiflorum* Michx. Fl. Bor. Am. 1: 216. 1803.
Trillium grandiflorum Salisb. Par. Lond. 1: *pl. 1.* 1805.

Stems usually stout, 8′–18′ high. Leaves broadly rhombic-ovate or rhombic-oval, 2½′–6′ long, acuminate at the apex, narrowed to the sessile or nearly sessile base; peduncle erect or somewhat inclined, 1½′–3′ long; sepals lanceolate or oblong-lanceolate, acuminate but sometimes bluntish, 1′–2′ long, spreading; petals erect-spreading, oblanceolate; obovate or rarely ovate-oblong, obtuse or cuspidate, strongly veined, white or pink, thin, longer than the sepals; anthers about ½′ long, longer than the filaments; styles slender, 3″–4″ long, ascending or erect; berry globose, black, slightly 6-lobed, 8″–12″ in diameter.

In woods, Quebec to Ontario and Minnesota, south to Florida and Missouri. Ascends to 5000 ft. in Virginia. May–June.

A monstrous form, with two long-petioled leaves, was collected by Dr. Pitcher in Michigan.

5. Trillium eréctum L. Ill-scented Wake-robin. (Fig. 1047.)

Trillium erectum L. Sp. Pl. 340. 1753.

Stem stout, 8′–16′ high. Leaves very broadly rhombic, 3′–7′ long, often as wide or wider, sessile, acuminate at the apex, narrowed at the base; peduncle 1¼′–4′ long, erect, inclined or declined beneath the leaves; sepals lanceolate, acuminate, spreading, ½′–1½′ long; petals lanceolate or ovate, acute or acutish, spreading, equalling the sepals or a little longer, dark purple, pink, greenish or white; anthers longer than the filaments; styles short, spreading or recurved; berry ovoid somewhat 6-lobed, reddish, 8″–12″ long.

In woods, Nova Scotia to James Bay and Manitoba, south to North Carolina, Tennessee and Missouri. Ascends to 3000 ft. in Virginia. Also in Japan. Flowers unpleasantly scented. April–June.

6. Trillium cérnuum L. Nodding Wake-robin. (Fig. 1048.)

Trillium cernuum L. Sp. Pl. 339. 1753.

Stem usually slender, 8′–20′ high. Leaves similar to those of the preceding species, broadly rhombic, acuminate at the apex, narrowed at the base, sessile, or with the petioles 1″–2″ long; peduncle ½′–1¼′ long, recurved beneath the leaves, the flower drooping; sepals lanceolate or ovate-lanceolate, acuminate, 6″–12″ long; petals white or pink, ovate-lanceolate or oblong-lanceolate, rolled backward, wavy-margined, equalling the sepals, or a little longer; anthers about as long as the subulate filaments; styles rather stout, recurved; berry ovoid, red-purple, pendulous, 8″–10″ long.

In rich woods, Nova Scotia to Ontario and Minnesota, south to Georgia and Missouri. Sometimes confounded with forms of the preceding. April–June.

7. Trillium undulàtum Willd. Painted Wake-robin. (Fig. 1049.)

Trillium undulatum Willd. Nene Schrift. Gesell. Nat. Fr. Berlin, 3:422. 1801.
Trillium erythrocarpum Michx. Fl. Bor. Am. 1:216. 1803.

Stem usually slender, 8′–2° high. Leaves ovate, 3′–8′ long, 2′–5′ wide, petioled, long-acuminate at the apex, obtuse or rounded at the base; petioles 2″–10″ long; flowers peduncled, erect or somewhat inclined, 1′–2½′ long; sepals lanceolate, acuminate, 9″–15″ long, spreading; petals ovate or ovate-lanceolate, acuminate or acute, white with purple veins or stripes, thin, longer than the sepals, widely spreading, wavy-margined; anthers about equalling the filaments; styles slender; berry ovoid, obtuse, bluntly 3-angled, bright red, shining, 6″–10″ in diameter.

In woods, Nova Scotia to Ontario and Wisconsin, south to Georgia and Missouri. Ascends to 5600 ft. in Virginia. May–June.

Family 21. SMILÀCEAE Vent. Tabl. 2: 146. 1799.*

SMILAX FAMILY.

Mostly vines, with woody or herbaceous, often prickly stems. Leaves alternate, netted-veined, usually punctate or lineolate, several-nerved, petioled. Petiole sheathing, bearing a pair of slender tendril-like appendages (stipules?), persistent, the blade falling away. Flowers small, mostly green, dioecious, in axillary umbels. Perianth-segments 6. Stamens mostly 6, distinct; filaments ligulate; anthers basifixed, 2-celled, introrse. Ovary 3-celled, the cavities opposite the inner perianth-segments; ovules 1 or 2 in each cavity, orthotropous, suspended; style very short or none; stigmas 1–3. Fruit a globose berry containing 1–6 seeds. Seeds brownish; endosperm horny, copious; embryo small, oblong, remote from the hilum.

Genera 3; species about 200, in warm and temperate regions; only the following in North America.

1. SMÌLAX L. Sp. Pl. 1028. 1753.

Rootstocks usually very large and tuberous, stems usually twining, and climbing by means of the spirally coiling appendages of the petiole. Lower leaves reduced to scales; upper leaves entire or lobed. Flowers regular. Perianth-segments distinct, deciduous. Pedicels borne on a globose or conic receptacle, inserted in small pits, generally among minute bractlets. Filaments inserted on the bases of the perianth-segments. Staminate flowers without an ovary. Pistillate flowers usually smaller than the staminate, with an ovary and usually with 1–6 abortive stamens. Berry black, red or purple (rarely white), with 3 strengthening bands of tissue running through the outer part of the pulp, connected at the base and apex. Embryo lying under a tubercle at the upper end of the seed. [Ancient Greek name, perhaps not originally applied to these plants.]

About 195 species of wide distribution, most abundant in tropical America and Asia. Besides the following, about 5 others occur in the southern United States, and 1 in California and Oregon.

Stem annual, herbaceous, unarmed.
- Petioles tendril-bearing; stems climbing.
  - Leaves usually ovate, thin. — 1. *S. herbacea.*
  - Leaves usually hastate, coriaceous. — 2. *S. tamnifolia.*
- Petioles without tendrils or nearly so; stems erect. — 3. *S. ecirrhata.*

Stem perennial, woody, usually armed with prickles.
- Berries black or bluish-black.
  - Fruit ripening the first year.
    - Leaves glaucous. — 4. *S. glauca.*
    - Leaves green on both sides.
      - Leaves rounded or lanceolate, 5-nerved. — 5. *S. rotundifolia.*
      - Leaves ovate, 7-nerved. — 6. *S. hispida.*
      - Leaves round-ovate, often narrowed at the middle, 7–9-nerved. — 7. *S. Pseudo-China.*
      - Leaves deltoid or deltoid-hastate, 5–7-nerved, often with 1 or 2 additional nerves on each side. — 8. *S. Bona-nox.*
  - Fruit ripening the second year; leaves elliptic or lanceolate, evergreen. — 9. *S. laurifolia.*
- Berries red.
  - Leaves ovate or ovate-lanceolate, base rounded; berries bright red. — 10. *S. Walteri.*
  - Leaves lanceolate, acute at the base; berries dull red. — 11. *S. lanceolata.*

*Text contributed by the late Rev. THOMAS MORONG.

1. Smilax herbàcea L. Carrion-flower. (Fig. 1050.)

Smilax herbacea L. Sp. Pl. 1030. 1753.
S. pulverulenta Michx. Fl. Bor. Am. 2: 238. 1803.
Coprosmanthus herbaceus Kunth, Enum. 5: 264. 1850.

Tubers short, thick, scarred, numerous. Stem herbaceous, glabrous, terete or obtusely angled, unarmed, commonly much branched. Petioles 4″–3½′ long; tendrils numerous; leaves ovate, rounded or lanceolate, acute, acuminate or cuspidate at the apex, obtuse or cordate at the base, thin, frequently downy beneath, 7–9-nerved, 1½′–5′ long, 1′–3½′ wide, the margins entire or denticulate; peduncles 4′–9′ long, usually 6–10 times as long as the petioles, flattened; umbels 15–80-flowered; pedicels 3″–8″ long; flowers carrion-scented when open; stamens sometimes 5 or 7; filaments 2–3 times as long as the anthers; berries bluish black, 2–4-seeded, 3″–4″ in diameter.

In woods and thickets, New Brunswick to Ontario and Dakota, south to Florida, Louisiana and Nebraska. April–June.

2. Smilax tamnifòlia Michx. Halberd-leaved Smilax. (Fig. 1051.)

S. tamnifolia Michx. Fl. Bor. Am. 2: 238. 1803.
Coprosmanthus tamnifolius Kunth, Enum. 5: 267. 1850.

Glabrous, herbaceous; stem and branches terete or obtusely angled, unarmed. Petioles ½′–1½′ long, the sheath tendril-bearing, very short or none; leaves coriaceous, mostly ovate-hastate, with broad obtuse lobes at the base, slightly narrowed at about the middle, acute obtuse or acuminate at the apex, truncate or subcordate at the base, entire, green on both sides, 1¼′–3′ long, ½′–2′ wide, 5–7-nerved; peduncles 1–3 from the same axil, 1′–4′ long, usually much longer than the leaves, often flattening in drying; umbels 10-30-flowered; pedicels 2″–3″ long; segments of the staminate flowers slightly pubescent; filaments 1–2 times as long as the anthers; berries black, 2″–3″ in diameter, 1–3-seeded.

In dry soil, southern New Jersey and Pennsylvania to South Carolina and Tennessee. May–July.

3. Smilax ecirrhàta (Engelm.) S. Wats. Upright Smilax. (Fig. 1052.)

Coprosmanthus herbaceus var. *ecirrhata* Engelm.; Kunth, Enum. 5: 266. 1850.
Smilax ecirrhatus S. Wats. in A. Gray, Man. Ed. 6, 520. 1890.

Stem herbaceous, glabrous, simple, erect, 6′–2° tall. Tendrils none, or sometimes present on the uppermost petioles; leaves often whorled at the summit of the stem, ovate, acute, obtuse, cuspidate or acuminate at the apex, rounded or cordate at the base, thin, 5–9-nerved, 2½′–5½′ long, 1¼′–4′ wide, sometimes larger, more or less pubescent beneath and erose-denticulate on the margins; petioles 10″–18″ long; peduncles long, often pubescent; staminate flowers commonly not more than 25 in the umbels; pedicels 2″–5″ long; anthers shorter than the filaments or equalling them.

In dry soil, Virginia to Minnesota and Florida. May–June.

4. Smilax glaùca Walt. Glaucous-leaved Greenbrier. (Fig. 1053.)

Smilax glauca Walt. Fl. Car. 245. 1788.
Smilax spinulosa J. E. Smith; Torr. Fl. N. Y. 2: 303. 1843.

Rootstock deep, knotted and tuberous. Stem terete; branches and twigs angled, armed with rather stout numerous or scattered prickles, or sometimes unarmed; petioles 3″–6″ long, tendril-bearing; leaves ovate, acute or cuspidate at the apex, sometimes cordate at the base, entire, glaucous beneath and sometimes also above, mostly 5-nerved, 1½′–6′ long, ½′–5′ wide; peduncles flattened 6″–16″ long; umbels 6–12-flowered; pedicels 2″–4″ long; berries bluish black, ripening the first year, about 3″ in diameter, 2–3-seeded.

In dry sandy soil, eastern Massachusetts to Florida, west to Kansas and Texas. May–June.

Smilax spinulòsa J. E. Smith, is a form with numerous small prickles on the lower part of the stem, and more elongated, sometimes halberd-shaped leaves. It occurs in southern New York, but is not well understood.

5. Smilax rotundifòlia L. Greenbrier. Catbrier. Horsebrier. (Fig. 1054.)

Smilax rotundifolia L. Sp. Pl. 1030. 1753.
Smilax caduca L. Sp. Pl. 1030. 1753.
Smilax quadrangularis Willd. Sp. Pl. 4: 775. 1806.

Rootstocks long, sparingly tuberous. Stem woody, terete, the branches and young shoots often 4-angled, glabrous; prickles scattered, stout, straight or a little curved, sometimes none; petioles 3″–6″ long; leaves thick and shining when mature, thin when young, ovate, nearly orbicular, or lanceolate, acute or acuminate at the apex, obtuse or cordate at the base, entire or the margins erose-denticulate, 5-nerved, 2′–6′ long, 10″–6′ wide; peduncles flattened 3″–1′ long; umbels 6–25-flowered; pedicels 1″–4″ long; perianth-segments pubescent at the tip; filaments 2–3 times as long as the anthers; berries black, 1–3-seeded, about 3″ in diameter, maturing the first year.

In woods and thickets, Ontario to Minnesota, south to Florida and Texas. April–June.

6. Smilax hìspida Muhl. Hispid Greenbrier. (Fig. 1055.)

Smilax hispida Muhl.; Torr. Fl. N. Y. 2: 302. 1843.

Glabrous, stem terete below, and commouly thickly hispid with numerous slender straight prickles, the branches more or less augled; petioles 4″–9″ long, tendril-bearing, rarely denticulate; leaves thin, green on both sides, ovate, abruptly acute and cuspidate at the apex, obtuse or subcordate at the base, 7-nerved, or the older ones sometimes with an additional pair of faint nerves, 2′–5′ long, 1′–5′ wide, the margins usually denticulate; peduncles flatteued, 9″–2′ long; umbels 10–26-flowered; pedicles slender, 2″–3″ long; filaments a little longer than the anthers; berries bluish black, about 3″ in diameter, maturing the first year.

In thickets, Ontario to Minnesota and Nebraska, south to Virginia and Texas. May–July.

7. Smilax Pseùdo-Chìna L. Long-stalked Greenbrier. (Fig. 1056.)

Smilax Pseudo-China L. Sp. Pl. 1031. 1753.

Glabrous throughout, rootstock often bearing large tubers, stem terete, the branches angled. Lower part of the stem beset with straight needle-shaped prickles, the upper part and the branches mostly unarmed; petioles 3″–12″ long; leaves firm, or becoming quite leathery when old, green on both sides or occasionally glaucous beneath, ovate, often narrowed at about the middle or lobed at base; acute or cuspidate at the apex, 7–9-nerved, 2½′–5′ long, 1½′–3½′ wide, often denticulate on the margins; peduncles flattened, 1′–3′ long, umbels 12–40-flowered; pedicels 3″–4″ long; stamens 6–10; anthers as long as the filaments or longer; berries black, 8–16 in the umbels, 2″–3″ in diameter, 1–3-seeded, maturing the first year.

In dry or sandy thickets, Maryland to Nebraska, south to Florida and Texas. March–Aug.

8. Smilax Bòna-nóx L. Bristly Greenbrier. (Fig. 1057.)

Smilax Bona-nox L. Sp. Pl. 1030. 1753.
Smilax hastata Willd. Sp. Pl. 4: 782. 1806.
Smilax tamnoides A. Gray, Man. 485. 1848. Not L.

Rootstocks bearing large tubers, stem terete or slightly angled, the branches often 4-angled. Prickles scattered or numerous, stout or needle-like, often wanting on the branches; petioles 3″–6″ long, often prickly; leaves thick, ovate or commonly deltoid-hastate, sometimes narrowed at the middle, glabrous, green and usually shining on both sides, often spiny on the margins and on the veins beneath, acute or abruptly cuspidate at the apex, obtuse, truncate or cordate at the base, 5–9-nerved, 1½′–4½′ long, 8″–3′ wide; peduncles slender, flattened, 7″–15″ long; umbels 15–45-flowered; pedicels 2″–4″ long; stigmas 1–3; berries 8-20 in the umbels, 2″–3″ in diameter, mostly 1-seeded, ripening the first year.

In thickets, Massachusetts to Kansas, Florida and Texas. April-July.

9. Smilax laurifòlia L. Laurel-leaved Greenbrier. (Fig. 1058.)

Smilax laurifolia L. Sp. Pl. 1030. 1753.

Rootstocks bearing tubers sometimes 6′ thick, stem stout, high-climbing, terete, striate, armed with strong straight prickles, the branches angled, mostly unarmed. Petioles stout, 3″–8″ long; leaves leathery, evergreen, elliptic or oblong-lanceolate, acute or abruptly cuspidate at the apex, narrowed at the base, entire, 3-nerved, or sometimes with an additional pair of nerves near the margins, 2′–4½′ long, ½′–2′ wide; peduncles stout, angled, 2″–10″ long; umbels 6–30-flowered; pedicels 2″–3″ long; anthers usually about one-third shorter than the filaments; stigma 1, sometimes 2; berries black, ovoid, 2″–3″ thick, not ripening until the second year.

In moist woods and thickets, southern New Jersey to Florida and Texas, north in the Mississippi Valley to Arkansas. March–Sept.

10. **Smilax Wàlteri** Pursh. Walter's Greenbrier. (Fig. 1059.)

Smilax Walteri Pursh, Fl. Am. Sept. 249. 1814.

Glabrous, stem angled, prickly below, the branches commonly unarmed. Petioles 2″–6″ long, stout, angled; leaves ovate or ovate-lanceolate, rarely lobed at the base, cordate or subcordate, obtuse or abruptly acute at the apex, entire, 5–7-nerved, 2′–5′ long, 10″–3¼′ wide; peduncles 2″–5″ long, flattened, thickening in age; umbels 6–15-flowered; pedicels very slender, 2″–3″ long; berries globose, coral-red (rarely white), 3″–4″ in diameter, 2–3-seeded, ripening the first year.

In wet soil, pine barrens of New Jersey to Florida, Tennessee and Louisiana. April–June.

11. **Smilax lanceolàta** L. Lance-leaved Greenbrier. (Fig. 1060.)

Smilax lanceolata L. Sp. Pl. 1031. 1753.

Glabrous, stem terete, usually prickly, the branches slender, long, slightly angled, mostly unarmed. Petioles 1″–2″ long; leaves rather thin, lanceolate, acute or acuminate at the apex, narrowed at the base, entire, shining above, 5–7-nerved, 2′–3½′ long, 6″–20″ wide; peduncles thick, angled, 3″–8″ long; umbels 8–40-flowered; pedicels 2″–7″ long; filaments longer than the anthers; berries dark red, globose, 2″–3″ in diameter, usually 2-seeded, ripening the first year.

In thickets, Virginia to Arkansas, Florida and Texas. March–Aug.

Family 22. **HAEMODORÀCEAE** R. Br. Prodr. Fl. Nov. Holl. 1: 299. 1810.

Bloodwort Family.

Perennial herbs with erect stems, narrowly linear leaves, and regular or somewhat irregular small perfect flowers in terminal cymose panicles. Perianth 6-parted or 6-lobed, adnate to the ovary, persistent. Stamens 3, opposite the 3 inner perianth-segments. Ovary wholly or partly inferior, 3-celled or rarely 1-celled; ovules usually few in each cavity, half-anatropous; style mostly slender; stigma small, entire or 3-grooved. Fruit a loculicidally 3-valved capsule. Seeds few or rarely numerous; embryo small, in fleshy endosperm.

About 9 genera and 35 species, mostly natives of South Africa and Australia, a few in tropical America; only the following genus in the north temperate zone.

1. **GYROTHÈCA** Salisb. Trans. Hort. Soc. 1: 327. 1812.

[Lachnanthes Ell. Bot. S. C. & Ga. 1: 47. 1816.]

A rather stout herb, with a short rootstock, red fibrous roots and equitant leaves, the basal ones longer than those of the stem. Flowers numerous, yellowish, small, in a dense terminal woolly cymose panicle. Perianth 6-parted to the summit of the ovary, the outer segments smaller than the inner. Filaments filiform, longer than the perianth; anthers linear-oblong, versatile. Ovary 3-celled; ovules few in each cavity, borne on fleshy placentae; style very slender, declined. Capsule enclosed by the withering-persistent perianth, nearly globular, 3-valved. Seeds about 6 in each cavity, flattened, nearly orbicular, peltate. (Greek, referring to the round fruit.)

A monotypic genus of southeastern North America and the West Indies.

1. Gyrotheca capitàta (Walt.) Morong. Red-root. (Fig. 1061.)

Anonymo capitata Walt. Fl. Car. 69. 1788.
Gyrotheca tinctoria Salisb. Trans. Hort. Soc. 1: 327. 1812.
Lachnanthes tinctoria Ell. Bot. S. C. & Ga. 1: 47. 1816.
Gyrotheca capitata Morong. Bull. Torr. Club, 20: 472. 1893.

Stem 1½°–2½° tall, glabrous below, pubescent or woolly above. Leaves 2″–5″ wide, acuminate, the basal ones shorter than the stem, the upper reduced to bracts; panicle 2′–5′ broad when expanded, dense and almost capitate when young, white-woolly; flowers 4″–5″ broad, bracteolate, the perianth yellow and glabrous within; style about as long as the stamens; pedicels stout, about as long as the capsule, rather shorter than the bractlets; capsule about 3″ in diameter.

In swamps, eastern Massachusetts to New Jersey and Florida, mostly in pine barrens near the coast. Also in Cuba. July–Sept.

Family 23. **AMARYLLIDÀCEAE** Lindl. Nat. Syst. Ed. 2: 328. 1836.

Amaryllis Family.

Perennial herbs (some tropical species woody or even arboreous), with bulbs or rootstocks, scapose or sometimes leafy stems and usually narrow and entire leaves. Flowers perfect, regular or nearly so. Perianth 6-parted or 6-lobed, the segments or lobes distinct, or united below into a tube which is adnate to the surface of the ovary (adnate only to the lower part of the ovary in *Lophiola*). Stamens 6 in our genera, inserted on the bases of the perianth-segments or in the throat of the perianth opposite the lobes. Anthers versatile or basifixed, 2-celled, the sacs usually longitudinally dehiscent. Ovary wholly or partly inferior, usually 3-celled. Style filiform, entire, lobed, or divided into 3 stigmas at the summit. Ovules usually numerous, rarely only 1 or 2 in each cavity of the ovary, anatropous. Fruit capsular, rarely fleshy. Seeds mostly black, the embryo small, enclosed in fleshy endosperm.

About 70 genera and 800 species, principally natives of tropical and warm regions, some in the temperate zones.

Bulbous herbs with flowers on scapes.
  Flower solitary; perianth without a crown.
    Anthers versatile; tube of the perianth not greatly elongated. 1. *Zephyranthes.*
    Anthers erect; tube of the perianth several times the length of its lobes. 2. *Cooperia.*
  Flowers clustered; perianth with a membranous crown connecting the lower parts of the filaments. 3. *Hymenocallis.*
Bulbless herbs, with rootstocks or corms.
  Perianth adnate to the whole surface of the ovary; leaves mostly basal.
    Tall, fleshy-leaved; anthers versatile. 4. *Agave.*
    Low, linear-leaved; anthers not versatile. 5. *Hypoxis.*
  Perianth adnate only to the lower part of the ovary; stem leafy; flowers woolly. 6. *Lophiola.*

1. ZEPHYRÁNTHES Herb. App. Bot. Reg. 36. 1821.

Glabrous herbs with coated bulbs, narrow leaves, and erect 1-flowered scapes, the flower large, erect, pink, white or purple. Perianth funnelform, naked in the throat, with 6 membranous equal erect-spreading lobes united below into a tube, subtended by an entire or 2-cleft bract. Stamens inserted on the throat of the perianth, equal or nearly so; anthers versatile. Ovary 3-celled; style long, filiform, 3-cleft at the summit; ovules numerous, in 2 rows in each cavity of the ovary. Capsule thin-walled, subglobose or depressed, 3-lobed, loculicidally 3-valved. Seeds mostly flattened, black or nearly so. [Greek, signifying wind-flower.]

About 30 species, natives of America. Besides the following, 4 others occur in the southern United States.

1. Zephyranthes Atamásco (L.) Herb. Atamasco Lily. Stagger-grass. (Fig. 1062.)

Amaryllis Atamasco L. Sp. Pl. 292. 1753.
Zephyranthes Atamasco Herb. App. Bot. Reg. 36. 1821.

Bulb ovoid, about 1′ long. Leaves fleshy, somewhat concave, shining, 6′–15′ long, about 1½″–3″ wide, blunt, usually shorter than the scape; scape terete, erect, 2″–3″ in diameter; bract membranous, 2-cleft into acuminate lobes, longer than the ovary; flowers 2′–3½′ high, white with a purplish tinge or sometimes light purple; perianth-segments oblong-lanceolate, acute, shorter than the tube; stamens shorter than the tube; stamens shorter than the perianth; style longer than the stamens; capsule depressed, about ½′ high.

In moist places, southern Pennsylvania (?); eastern Virginia, Florida and Alabama. Perianth rarely 8-lobed. March–June.

2. COOPÈRIA Herb. Bot. Reg. *pl. 1835.* 1836.

Low herbs with coated bulbs, very narrow grass-like leaves and slender 1-flowered scapes, the flower large, long, erect, subtended by a membranous spathe-like bract. Perianth salver-form with 6 oval or ovate spreading lobes united into a tube several times their length, the tube cylindric or slightly dilated at the summit. Stamens inserted on the throat of the perianth; filaments short; anthers linear, erect. Ovary 3-celled; style filiform; stigma slightly 3-lobed; ovules numerous, in 2 rows in each cavity of the ovary. Capsule depressed, globose or obovoid, 3-lobed, loculicidally 3-valved. Seeds numerous, horizontal, black. [In honor of Daniel Cooper, 1817?–1842, Curator, Botanical Society of London.]

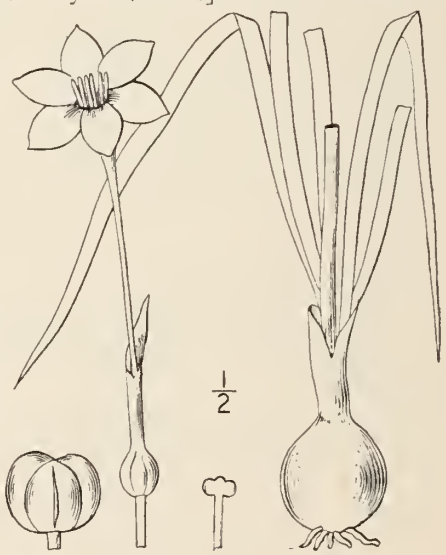
Two known species, natives of the southwestern United States and Mexico.

1. Cooperia Drummóndii Herb. Drummond's Cooperia. (Fig. 1063.)

Cooperia Drummondii Herb. Bot. Reg. *pl. 1835.* 1836.

Bulb globose, about 1′ in diameter. Leaves 6′–12′ long, 2″–3″ wide, erect; scape slender, hollow, about as long as the leaves; spathe-like bract 1′–2′ long, 2-cleft above into acuminate lobes 4″–6″ long; flower 3′–5′ high, white or pinkish; tube of the perianth very slender, about 1½″ in diameter, slightly expanded just below the limb; segments oblong, obtuse and cuspidate or acutish, nearly 1′ long, 3″–4″ wide, ovary sessile; capsule somewhat obovoid, about ½′ in diameter, deeply lobed.

On prairies, Kansas to Louisiana, Texas, Mexico and New Mexico. April–July.



3. HYMENOCÁLLIS Salisb. Trans. Hort. Soc. 1: 338. 1812.

Mostly tall bulbous herbs with usually lanceolate or linear-oblong leaves, and large white sessile or short-pedicelled umbelled flowers on erect solid scapes, each flower subtended by 2 long membranous bracts. Perianth of 6 spreading or recurved narrow equal elongated lobes, united below into a long cylindric tube. Stamens inserted in the top of the perianth-tube, the lower parts of the long filaments connected by a membranous cup-like crown; anthers linear, versatile. Ovary 3-celled; ovules only 1 or 2 in each cavity; style filiform, long-exserted; stigma small, entire or nearly so. Capsule ovoid or globose, rather fleshy. Seeds usually only 1 or 2, large, green, fleshy. [Greek, beautiful membrane, referring to the crown.]

About 30 species, all American. Besides the following, 10 others occur in the southern States.

1. **Hymenocallis occidentàlis** (Le Conte) Kunth. Hymenocallis. (Fig. 1064.)

Pancratium Carolinianum L. Sp. Pl. 291. 1753.?
Pancratium occidentale LeConte, Ann. Lyc. N. Y. 3: 146. 1830.
Hymenocallis occidentalis Kunth, Enum. 5: 856. 1850.

Bulb large. Leaves linear-oblong, narrowed at each end, fleshy glaucous, 1°–2° long, 9″–2′ wide; scape stout, equalling or longer than the leaves; bracts linear-lanceolate, 1½′–2½′ long; umbel several-flowered; perianth-tube 1½″–2″ in diameter, 3′–5′ long, the linear lobes nearly as long; crown funnelform, narrowed below, 1′–1¼′ long, its margins entire, erose or 2-toothed between the filaments; free part of the filaments about 1′ long, white; anthers about ½′ long and ½″ wide, yellow; style extending for 2′–3′ beyond the crown, green; fruit 6″–9″ in diameter.

In moist soil, Georgia to southern Illinois and Missouri. July–Sept.

4. AGÀVE L. Sp. Pl. 323. 1753.

Fleshy herbs, some tropical species very tall, with a short crown-like or erect rootstock (caudex) and tall bracted scapes, the leaves large, thick, sometimes spiny-toothed, basal, or clustered at the top of the caudex, and large, bracted flowers in terminal spikes or compound clusters. Perianth tubular or funnelform, withering-persistent, of 6 erect or spreading equal or nearly equal lobes, united below into a tube. Stamens inserted on the perianth at the bases of the lobes, exserted; filaments flattened or filiform; anthers versatile. Ovary 3-celled; style slender, exserted, 3-lobed; ovules numerous, in 2 rows in each cavity of the ovary. Capsule ovoid, subglobose or oblong, 3-lobed, thick-walled, many-seeded. Seeds compressed, somewhat cuneate, black. [Greek, signifying noble.]

About 140 species, all American. Besides the following, some 12 others occur in the southwestern States.

1. **Agave Virgínica** L. False Aloe. (Fig. 1065.)

Agave Virginica L. Sp. Pl. 323. 1753.

Glabrous throughout, rootstock a short crown with numerous fibrous roots, Scape 2°–6° tall, rather slender, sometimes nearly ½′ in diameter at the base, its bracts distant, long-acuminate, the lower 3′–6′ long; leaves narrowly oblong, ½°–2° long, ½′–2½′ wide, acuminate, their margins entire or denticulate; spike 1°–2° long, loose; flowers greenish yellow, odorous, solitary in the axils of short bracts, sessile or the lowest distinctly pedicelled; perianth nearly tubular, slightly expanded above, 8″–12″ long, the tube about twice as long as the erect lobes; filaments at length about as long as the perianth; capsule 5″–8″ in diameter, slightly longer than thick, abruptly contracted into a short stalk.

In dry soil, Maryland to Indiana and Missouri, south to Florida and Texas.

5. HYPÓXIS L. Syst. Ed. 10, 2: 986. 1759.

Low, mostly villous herbs with a corm or short rootstock, grass-like leaves and slender few-flowered scapes, the flowers rather small. Perianth 6-parted, its segments equal or nearly so, separate to the summit of the ovary, spreading, withering-persistent, the 3 outer ones greenish on the lower side in our species. Stamens inserted on the bases of the perianth-segments; filaments short; anthers erect, sagittate or entire. Ovary 3-celled; style short; stigmas 3, erect; ovules numerous, in 2 rows in each cavity. Capsule subglobose or oblong, thin-walled, not dehiscent by valves. Seeds globular, black, laterally short-beaked by their stalks. [Greek, originally given to some plant with sour leaves.]

About 50 species, widely distributed. Besides the following, 2 others occur in the southern States.

1. **Hypoxis hirsùta** (L.) Coville. Star-grass. (Fig. 1066.)

Ornithogalum hirsutum L. Sp. Pl. 306. 1753.
Hypoxis erecta L. Syst. Ed. 10, 2: 986. 1759.
Hypoxis hirsuta Coville, Mem. Torr. Club, 5: 118. 1894.

Corm ovoid, oblong or globose, ¼′–½′ in diameter, with numerous fibrous roots. Leaves basal, narrowly linear, 1″–2½″ wide, more or less villous, mostly longer than the scapes; scapes slender, erect, villous above, usually glabrous below, 2′–6′ high; flowers 1–6, umbellate; bracts subulate, shorter than the pedicels; perianth-segments narrowly oblong, spreading, mostly obtuse, bright yellow within, greenish and villous without, 3″–5″ long; stamens somewhat unequal; style rather shorter than the stamens, 3-angled, the stigmas decurrent on the angles; capsule about 1½″ in diameter; seeds angled, black.

In dry soil. Maine and Ontario to Assiniboia, Florida and Texas. Ascends to 3000 ft. in Virginia. May–Oct.

6. LOPHÌOLA Ker, Bot. Mag. *pl. 1596.* 1814.

An erect perennial herb with slender rootstocks, fibrous roots erect sparingly leafy stems, the leaves narrowly linear and mostly basal, and numerous small yellowish flowers in a terminal woolly cymose panicle. Perianth campanulate, persistent, of 6 nearly equal woolly erect-spreading segments, slightly united at the base, and adnate to the lower part of the ovary. Stamens inserted on the bases of the perianth-segments; filaments filiform, short; anthers basifixed. Ovary 3-celled; style subulate, at length 3-cleft; ovules numerous, in 2 rows in each cavity. Capsule ovoid, tipped with the style, finally loculicidally 3-valved at the summit. Seeds oblong, numerous, ribbed. [Greek, referring to the tufts of wool on the perianth.]

A monotypic genus of southeastern North America.

1. **Lophiola Americàna** (Pursh) Coville. Lophiola. (Fig. 1067.)

Conostylis Americana Pursh, Fl. Am. Sept. 224. 1814.
Lophiola aurea Ker, Bot. Mag. *pl. 1596.* 1814.
Lophiola Americana Coville, Mem. Torr. Club, 5: 118. 1894.

Stem stiff, erect, terete, glabrous below, white-woolly above, 1°–2° tall. Leaves equitant, glabrous, much shorter than the stem, the upper ones reduced to bracts; panicle densely white-woolly, composed of numerous few–several-flowered cymes; pedicels short, rather stout, erect or ascending; perianth-segments linear-lanceolate, about 2″ long, woolly outside, longer than the stamens and with a tuft of wool at the base within; capsule about as long as the persistent style, shorter than the perianth.

Pine barren bogs, New Jersey to Florida. June–Aug.

Family 24. DIOSCOREÀCEAE Lindl. Nat. Syst. Ed. 2, 359. 1836.

YAM FAMILY.

Herbaceous or slightly woody twining vines with fleshy or woody rootstocks, slender stems, petioled, mostly cordate, several-nerved and reticulate-veined leaves, alternate or the lower opposite or verticillate, and small inconspicuous dioecious or monoecious (in some exotic genera perfect) regular flowers in spikes, racemes or panicles. Perianth 6-parted, that of the pistillate flowers persistent. Staminate flowers with 6 or 3 stamens, sometimes with a rudimentary ovary. Pistillate flowers with an inferior 3-celled ovary, 3 styles and 3 terminal stigmas, sometimes also with 3 or 6 staminodia; ovules 2 (rarely 1) in each cavity of the ovary, pendulous, anatropous or amphitropous. Fruit a 3-valved, 3-angled capsule in the following genus. Endosperm of the seed fleshy or cartilaginous, enclosing the small embryo.

About 9 genera and 175 species, mostly natives of America, a few in the Old World.

1. DIOSCORÈA L. Sp. Pl. 1032. 1753.

Characters of the family as defined above. [Name in honor of the Greek naturalist Dioscorides.]

There are about 160 species, most numerous in tropical regions, a few extending into the temperate zones. The large fleshy rootstocks of several tropical species furnish the yams of commerce.

1. Dioscorea villòsa L. Wild Yam-root. (Fig. 1068.)

Dioscorea villosa L. Sp. Pl. 1033. 1753.

Rootstock knotted, horizontal, woody, ½′-1′ thick. Stem 6°–15° long, twining or rarely suberect, glabrous; leaves ovate, entire, slender-petioled, alternate or the lower opposite or in 4's, acuminate at the apex, cordate at the base, 2′–6′ long, 1′–4′ wide, 9–13-nerved, thin, green and glabrous or nearly so above, pale and more or less pubescent beneath; petioles often longer than the blades; flowers greenish yellow, nearly sessile, the staminate 1″–1½″ broad in drooping panicles 3′–6′ long, the pistillate about 3″ long in drooping spicate racemes; capsules membranous, yellowish green, 7″–12″ long, strongly 3-winged, containing 2 or sometimes only 1 flat thin-winged seed in each cavity.

In moist thickets, Rhode Island to Ontario and Minnesota, south to Florida and Texas. Ascends to 4000 ft. in Virginia. June-July. Fruit ripe Sept., persistent on the vines into the winter.

Family 25. IRIDÀCEAE Lindl. Nat. Syst. Ed. 2, 382. 1836.

IRIS FAMILY.

Perennial herbs with narrow equitant 2-ranked leaves and perfect regular or irregular mostly clustered flowers subtended by bracts. Perianth of 6 segments or 6-lobed, its tube adnate to the ovary, the segments or lobes in two series, convolute in the bud, withering-persistent. Stamens 3, inserted on the perianth opposite its outer series of segments or lobes; filaments filiform, distinct or united; anthers 2-celled, extrorse. Ovary inferior, mostly 3-celled; ovules mostly numerous in each cell, anatropous; style 3-cleft, its branches sometimes divided. Capsule 3-celled, loculicidally dehiscent, 3-angled or 3-lobed (sometimes 6-lobed), many-seeded. Endosperm of the seed fleshy or horny; embryo straight, small.

About 57 genera and 1000 species, of wide distribution.

Style-branches opposite the anthers, very broad, petal-like.	1. *Iris.*
Style-branches alternate with the anthers, slender or filiform.	
Style-branches 2-cleft; plants bulbous.	2. *Nemastylis.*
Style-branches undivided; plants not bulbous.	
Filaments all distinct; seeds fleshy.	3. *Gemmingia.*
Filaments united; seeds dry.	4. *Sisyrinchium.*

1. ÌRIS L. Sp. Pl. 38. 1753.

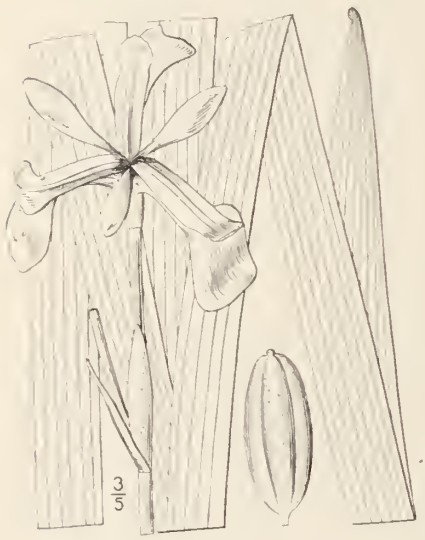
Herbs with creeping or horizontal, often woody and sometimes tuber-bearing rootstocks, erect stems, erect or ascending equitant leaves, and large regular terminal sometimes panicled flowers. Perianth of 6 clawed segments united below into a tube, the 3 outer dilated, spreading or reflexed, the 3 inner narrower, smaller, usually erect, or in some species about as large as the outer. Stamens inserted at the base of the outer perianth-segments; anthers linear or oblong. Ovary 3-celled; divisions of the style petal-like, arching over the stamens, bearing the stigmas immediately under their mostly 2-lobed tips; style-base adnate to the perianth-tube. Capsule oblong or oval, 3–6-angled or lobed, mostly coriaceous. Seeds numerous, vertically compressed in 1 or 2 rows in each cell. [Greek, rainbow, referring to the variegated flowers.]

About 100 species, mostly in the north temperate zone. Besides the following, some 8 others occur in the southern and western parts of North America. The names *Flower-de-luce* and *Fleur-de-lis* are applied to the species.

Stems tall, usually several-flowered, leafy; outer perianth-segments larger than the inner.
- Flowers blue, variegated with yellow, white or green (rarely all white).
  - None of the perianth-segments crested; native species.
    - Leaves ½′–1′ wide.
      - Leaves somewhat glaucous. 1. *I. versicolor.*
      - Leaves bright green, not glaucous.
        - Outer perianth-segments 3′–4′ long; flowers sessile. 2. *I. hexagona.*
        - Outer perianth-segments 2½′–3′ long; flowers pedicelled. 3. *I. Caroliniana.*
    - Leaves much narrower, 2″–4″ wide.
      - Capsule obtusely angled, 3-6-lobed
        - Capsule 3-lobed; northern. 4. *I. Hookeri.*
        - Capsule 6-lobed; western. 5. *I. Missouriensis.*
      - Capsule sharply 3-angled. 6. *I. prismatica.*
  - Outer perianth-segments strongly crested; introduced. 7. *I. Germanica.*
- Flowers reddish or red-brown. 8. *I. fulva.*
- Flowers bright yellow; introduced species. 9. *I. Pseudacorus.*

Stems low, seldom over 6′ tall, 1–3-flowered; outer and inner perianth-segments nearly equal.
- Outer perianth-segments crested; leaves lanceolate.
  - Perianth-tube very slender, exceeding the bracts. 10. *I. cristata.*
  - Perianth-tube expanded above, not exceeding the bracts. 11. *I. lacustris.*
- Outer perianth-segments crested, claws slightly pubescent; leaves linear. 12. *I. verna.*

1. Iris versícolor L. Larger Blue Flag. (Fig. 1069.)



Iris versicolor L. Sp. Pl. 39. 1753.

Iris Virginica L. Sp. Pl. 39. 1753.

Rootstock horizontal, thick, fleshy, covered with the fibrous roots. Stems terete or nearly so, straight or flexnous, 2°–3° tall, often branched above, leafy; leaves erect, shorter than the stem, somewhat glaucous, 6″–12″ wide; bracts commonly longer than the pedicels, the lower one sometimes foliaceous; flowers several, violet-blue, variegated with yellow, green and white; perianth-segments glabrous, crestless, the outer ones spatulate, 2′–3′ long, longer and wider than the inner; perianth-tube dilated upward, shorter than the ovary; capsule oblong, obscurely 3-lobed, about 1½′ long and 8″ in diameter; seeds 2″–3″ broad, in 2 rows in each cell.

In marshes, thickets, and wet meadows, Newfoundland to Manitoba, south to Florida and Arkansas. May–July.

2. Iris hexagòna Walt. Southern Blue Flag. (Fig. 1070.)

Iris hexagona Walt. Fl. Car. 66. 1788.

Rootstock stout, thick. Stems terete, usually simple, straight or flexuous, leafy, 1°–3° tall; leaves ½′–1½′ wide, green, not glaucous, the lower often 2°–3° long; flowers solitary in the upper axils, sessile, similar to those of *I. versicolor*, but larger, the broader outer crestless perianth segments often 4′ long and over 1′ wide, much wider than the erect inner ones; perianth-tube rather longer than the ovary, a little dilated upward; capsule oblong cylindric, 6-angled, about 2′ long; seeds in 2 rows in each cavity.

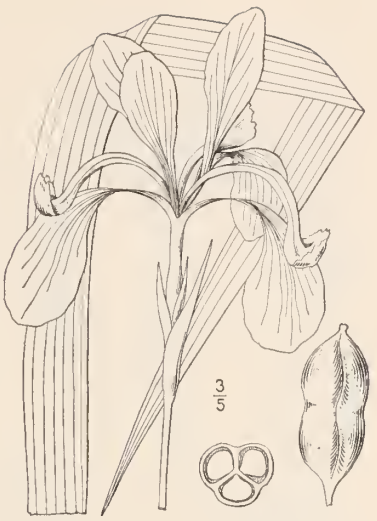
In swamps, South Carolina and Florida to Kentucky, Missouri and Texas. April–May.

3. Iris Caroliniàna S. Wats. Carolina Blue Flag. (Fig. 1071.)

Iris Caroliniana S. Wats. in A. Gray, Man. Ed. 6, 514. 1890.

Rootstock stout, fleshy. Stem rather stout, simple or branched 2°–3° tall, equalled or exceeded by the bright green leaves which are 8″–1¼′ wide; flowers solitary or 2 or 3 together, lilac, variegated with yellow, purple and brown, pedicelled; pedicels somewhat shorter than the bracts; outer perianth-segments broadly spatulate, 2½′–3′ long, with narrow claws, the inner narrower and nearly erect; perianth-tube about ½′ long above the ovary; capsule oblong, obtusely 3-angled, 1½′–2′ long; seeds in 1 row in each cavity, 4″–5″ broad.

In swamps, southern Virginia and eastern North Carolina. May–June.



4. Iris Hóokeri Penny. Hooker's Blue Flag. (Fig. 1072.)

Iris Hookeri Penny; Steud. Nomencl. Ed. 2, Part 1, 822. 1840.

Rootstock rather slender. Stems slender, simple or branched, terete, 10′–20′ tall. Leaves mostly basal, narrowly linear, bright green, shorter than or equalling the stem, 2″–4″ wide; flowers solitary or 2 together, pedicelled, the pedicels shorter than the bracts; perianth-segments glabrous, crestless, the inner ones oblanceolate, much shorter and smaller than the outer; capsule short-oblong, 1′–1½′ long, 7″–10″ in diameter, thin-walled, transverscly veined, obtuscly 3-lobed; seeds in 2 rows in each cavity, about 1½″ broad.

On river shores, Newfoundland to Quebec and Maine. Summer.

5. Iris Missouriénsis Nutt. Western Blue Flag. (Fig. 1073.)

Iris Missouriensis Nutt. Journ. Acad. Phila. 7: 58. 1834.

Rootstock stout. Stem rather slender, usually simple, terete, 6′–2° tall, 1–2-flowered; leaves mostly basal, green, sometimes purplish below, shorter than or about equalling the stem, 2″–4″ wide; flowers pale blue and variegated, pedicelled; pedicels slender, ½′–2′ long, usually shorter than the scarious bracts; perianth-segments glabrous, crestless, the outer ones 2′–2½′ long, the inner somewhat shorter, the tube 3″–4″ long above the ovary; capsule oblong, 1′–1½′ long, about ½′ in diameter, obtusely 6-angled, faintly veined.

In wet soil, South Dakota to Montana and Nevada, south to Colorado and Arizona. May–July.

6. Iris prismática Pursh. Slender Blue Flag. (Fig. 1074.)

Iris Virginica Muhl. Cat. 4. 1813. Not L. 1753.
Iris prismatica Pursh, Fl. Am. Sept. 30. 1814.
Iris gracilis Bigel. Fl. Bost. 12. 1814.

Rootstock rather slender, tuberous-thickened. Stems slender, often flexuous, 1°–3° tall, usually simple, bearing 2 or 3 leaves; leaves almost grass-like, 1½″–2½″ wide, mostly shorter than the stem; flowers solitary or 2 together, blue veined with yellow, slender-pedicelled; pedicels commonly longer than the bracts; outer perianth-segments 1½′–2′ long, glabrous and crestless, the inner smaller and narrower, the tube 2″–3″ long above the ovary; capsule narrowly oblong, acute at each end, sharply 3-angled, 1′–1½′ long, 3″–4″ thick; seeds about 1″ broad, thick, borne in 1 row in each cavity.

In wet grounds, New Brunswick to Pennsylvania and North Carolina, mainly near the coast. May–June.

7. Iris Germánica L. Fleur-de-lis. (Fig. 1075.)

Iris Germanica L. Sp. Pl. 38. 1753.

Rootstock thick. Stems stout, usually branched and several-flowered, 2°–3° tall, bearing several leaves. Leaves glaucous, 8″–2′ wide, the basal ones mostly shorter than the stem; bracts scarious; flowers nearly sessile in the bracts, large and very showy, deep violet-blue veined with yellow and brown or sometimes white; outer perianth-segments broadly obovate, 3′–4′ long, their claws strongly crested; inner perianth-segments narrower, arching.

Escaped from gardens to roadsides in Virginia. Native of Europe. May–June.

Iris Duerinckii Buckley, Am. Journ. Sci. 45: 176, described from specimens collected at St. Louis, Mo., but doubtless cultivated, appears to be *I. aphylla* L., a native of central Europe.

8. Iris fúlva Ker. Red-brown Flag. (Fig. 1076.)

Iris fulva Ker, Bot. Mag. *pl. 1496.* 1812.

Iris cuprea Pursh, Fl. Am. Sept. 30. 1814.

Rootstock stout, fleshy. Stems rather slender, 2°–3° tall, simple or branched, several-flowered and bearing 2–4 leaves; leaves pale green and somewhat glaucous, shorter than or equalling the stem, 3″–8″ wide; pedicels ½′–1′ long, shorter than the bracts; flowers reddish brown, variegated with blue and green; perianth-segments glabrous, crestless, the outer ones 1½′–2′ long, the inner smaller, spreading; style-branches 2″–3″ wide.

In swamps, southern Illinois to Georgia and Louisiana, west to Missouri, Arkansas and Texas. May–June.

9. Iris Pseudácorus L. Yellow Flag. (Fig. 1077.)

Iris Pseudacorus L. Sp. Pl. 38. 1753.

Rootstock thick. Stems 1½°–3° high, usually several-flowered; leaves pale green and glaucous, stiff, 4″–8″ wide, the lower equalling or longer than the stem; flowers bright yellow, short-pedicelled; perianth-segments glabrous and crestless, the outer broadly obovate, 2′–2½′ long, the inner oblong, nearly erect, scarcely longer than the claws of the outer ones; capsule oblong, 2′–3′ long.

In marshes, Massachusetts to New York (Ohio?) and New Jersey. Naturalized or adventive from Europe. May–July.

10. Iris cristàta Ait. Crested Dwarf Iris. (Fig. 1078.)

Iris cristata Ait. Hort. Kew. 1: 70. 1789.

Rootstock slender, branched, creeping, tuberous-thickened. Stems only 1′–3′ high, 1–2-flowered; leaves lanceolate, bright green, 4′–9′ long, 3″–9″ wide, much exceeding the stems; scape flattened, flowers blue, pedicelled; perianth-segments obovate, 1′–1½′ long, the outer crested, little longer than the naked inner ones, the tube very slender, 1½′–2½′ long above the ovary, longer than the bracts; capsule oval, sharply triangular, narrowed at each end, 6″–9″ high, 4″–5″ thick.

On hillsides and along streams, Maryland to southern Ohio and Indiana, south to Georgia, Tennessee and Missouri. April–May.

11. Iris lacústris Nutt. Dwarf Lake Iris. (Fig. 1079.)

Iris lacustris Nutt. Gen. 1: 23. 1818.

Similar to the preceding species in size and foliage, or the leaves rather narrower, sometimes wavy-margined. Flowers blue; perianth-tube only ½′–1′ long, shorter than the bracts and the sometimes yellowish perianth-segments, somewhat expanded upward; capsule ovoid, about 8″ high, borne on a pedicel of about its own length.

Shores of Lakes Huron and Superior. Local. Reported from the following localities: Presque Isle, Mackinac City, Bois Blanc Island and Drummond's Island, Mich.; Bruce Peninsula and Southampton, Ont. May.

12. **Iris vérna** L. Dwarf Iris. (Fig. 1080.)

Iris verna L. Sp. Pl. 39. 1753.

Rootstock slender. Stems 1′–3′ high, usually 1-flowered. Leaves narrowly linear, 3′–8′ high, 2″–5″ wide; flowers violet-blue or rarely white, pedicelled; perianth-segments crestless, the outer about 1½′ long, obovate, narrowed into slightly pubescent slender yellow claws, the inner somewhat smaller, glabrous; capsule obtusely triangular, short.

On shaded hillsides and in woods, southern Pennsylvania to Virginia, Kentucky and Georgia. Rootstock described as "pungently spicy." April–May.

2. **NEMÁSTYLIS** Nutt. Trans. Am. Phil. Soc. (II.) 5: 157. 1833–37.

[EUSTYLIS Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 235. 1845.]

Bulbous herbs with erect slender terete usually branched stems and elongated linear folded leaves. Flowers rather large, in our species blue or purple, solitary or several together, fugacious, subtended by 2 herbaceous bracts. Perianth of 6 spreading nearly equal obovate segments, distinct nearly or quite to the summit of the ovary. Filaments more or less united; anthers short; style short, its branches alternate with the anthers, each slenderly 2-parted; stigmas small, terminal. Capsule oblong, ovoid or obovoid, loculicidally dehiscent at the summit. [Greek, referring to the thread-like style-branches.]

About 10 species, natives of America. Besides the following, some 3 others occur in the southern United States.

1. **Nemastylis acùta** (Bart.) Herb. Northern Nemastylis. (Fig. 1081.)

Ixia acuta Bart. Fl. N. A. 2: 89. *pl. 66.* 1822.
Nemastylis gemmiflora Nutt. Trans. Am. Phil. Soc. (II.) 5: 157. 1833–37.
Nemastylis acuta Herb. Bot. Mag. *pl. 3779.* 1839–40.

Bulb dark colored, ovoid, scaly, 1′ or less long. Stem 1°–2° tall, bearing 3 or 4 leaves, 3′–10′ long, 1½″–2½″ wide; bracts lanceolate, each pair subtending 1 or 2 flowers; flowers light blue or purple, 1′–2′ broad, slender-pedicelled; pedicels rather shorter than the bracts; perianth-segments oblong-obovate, obtuse; style-branches exserted between the free parts of the filaments, their filiform divisions 2″–3″ long; capsule obovoid, 5″–6″ high, 3″–4″ in diameter.

On prairies, Tennessee to Kansas and Arkansas, south to Louisiana and Texas. April–June.

3. **GEMMÍNGIA** Fabr. Enum. Pl. Hort. Helm. 1759.

[BELAMCANDA Adans. Fam. Pl. 2: 60. 1763.]
[PARDANTHUS Ker, in Koenig & Sims, Ann. Bot. 1: 246. 1805.]

An erect perennial herb, with short stout rootstocks and *Iris*-like leaves. Flowers in terminal bracted clusters, rather large, orange and purple-mottled. Perianth of 6 oblong spreading nearly equal withering-persistent segments, distinct very nearly to the summit of the ovary. Stamens inserted on the bases of the segments; filaments distinct; anthers linear-oblong. Style very slender, enlarged above, the 3 slender undivided branches alternate with the anthers. Capsule fig-shaped, obovoid, thin-walled, loculicidally 3-valved, the valves recurving, finally falling away, exposing the mass of black fleshy seeds, which are borne on a central axis.

A monotypic genus of eastern Asia.

1. Gemmingia Chinénsis (L.) Kuntze. Blackberry Lily. (Fig. 1082.)

Ixia Chinensis L. Sp. Pl. 36. 1753.
Belamcanda Chinensis DC. in Red. Lil. 3: *pl. 121.* 1807.
Pardanthus Chinensis Ker, in Koenig & Sims, Ann. Bot. 1: 246. 1805.

Stem rather stout, 1½°–4° tall, leafy. Leaves pale green, nearly erect, equitant, folded, 8′–10′ long, 8″–12″ wide, the two sides united above the middle; bracts lanceolate, much shorter than the leaves, the upper ones scarious; flowers several or numerous, 1½′–2′ broad; perianth-segments obtuse at the apex, narrowed at the base, persistent and coiled together on the ovary after flowering, mottled with crimson and purple on the upper side; capsule about 1′ high and rather more than ½′ in diameter, truncate or rounded at the summit; mass of globose seeds erect, resembling a blackberry, whence the common name.

On hills and along roadsides, southern New York to Georgia, Indiana and Missouri. Naturalized from Asia. June–July. Fruit ripe July–Sept.

4. SISYRÍNCHIUM L. Sp. Pl. 954. 1753.

Perennial tufted slender herbs, with short rootstocks, simple or branched 2-edged or 2-winged stems, linear grass-like leaves, and rather small mostly blue terminal flowers umbellate from a pair of erect green bracts. Perianth-tube short or none, the 6 spreading segments oblong or obovate, equal, mostly aristulate. Filaments united to above the middle in our species. Ovary 3-celled, each cavity several ovuled. Style-branches filiform, undivided, alternate with the anthers. Capsule globose, oval or obovoid, loculicidally 3-valved. Seeds subglobose or ovoid, smooth or pitted, dry.

About 70 species, all American. Besides the following, some 7 others occur in the Western States. Those here described have all been referred to *S. Bermudiana* L., by American authors.

The two bracts equal or nearly so; stems usually branched above.
Leaves 1″–3″ wide; capsule subglobose, 2″–3″ in diameter when mature. 1. *S. graminoides.*
Leaves ¼″–1½″ wide; capsule oval, 1″–2″ in diameter when mature. 2. *S. Atlanticum.*
The lower of the bracts longer than the upper; stems mostly simple. 3. *S. angustifolium.*

1. Sisyrinchium graminoìdes Bicknell. Stout Blue-eyed Grass. (Fig. 1083.)

Sisyrinchium anceps S. Wats. in A. Gray, Man. Ed. 6, 515. 1890. Not Cav.
Sisyrinchium graminoides Bicknell, Bull. Torr. Club, 23: 133. 1896.

Rather light green, somewhat glaucous; stem broadly 2-winged, stout, erect, or reclining, 8′–18′ tall, usually terminating in two unequal branches subtended by a conspicuous grassy leaf. Basal leaves equalling or shorter than the stem, 1″–3″ wide; often lax and grass-like; edges of stems and leaves usually perceptibly rough-serrulate; bracts 1′ long or less, green, nearly or quite equal but the outer one occasionally prolonged; umbels 2–4-flowered; pedicels filiform, 8″–12″ long, exceeding the bracts, finally often spreading or recurved; flowers 6″–9″ broad; petals sparsely pubescent on outer surface; capsule subglobose, 2½″–3″ in diameter when mature; seeds black, nearly globular, about ½″–⅔″ in diameter, pitted.

In grassy places, in moist or dryish soil, sometimes in woods, Massachusetts to Florida and Louisiana. Plant dark in drying. April–June.

2. Sisyrinchium Atlánticum Bicknell. Eastern Blue-eyed Grass, (Fig. 1084.)

Sisyrinchium Atlanticum Bicknell, Bull. Torr. Club, 23: 134. 1896.

Similar to the preceding, but paler, glaucous green, often more tufted, the stem more slender and weaker, rather narrowly 2-winged, very smooth-edged, sometimes 2° long and reclining, terminating in two or three mostly subequal branches, often also with one or two lateral ones; branches slender and wiry, often recurved and forming a distinct angle with the floral bracts. Leaves narrower, rarely over 1″ wide, the basal ones usually much shorter than the stem; bracts nearly or quite equal, narrow, mostly somewhat scarious, often purplish; flowers slightly smaller; outer surface of perianth and young capsule minutely downy; capsules 2–7, usually 5, on generally erect pedicels, 7″–10″ long; oval, 1″–2″ long and ¾″–1½″ in diameter; seeds oval, subglobose, ¼″–½″ in diameter, dark, faintly pitted or nearly smooth.

In moist fields, meadows and brackish marshes, often in sandy soil, Newfoundland to Florida, mainly near the coast. May–June.

3. Sisyrinchium angustifòlium Mill. Pointed Blue-eyed Grass. (Fig. 1085.)

S. angustifolium Mill. Gard. Dict. Ed. 7. 1759.
Sisyrinchium anceps Cav. 6: 345. *pl. 190. f. 2.* 1788.
S. mucronatum Michx. Fl. Bor. Am. 2: 33. 1803.

Pale glaucous green, stems 2-edged, scarcely 2-winged, slender, rigid, erect, 3′–14′ tall, simple, or very rarely forking into 2 branches above. Leaves commonly all basal, rigid and often almost setaceous, the edges rough or smooth, ¼″–1¼″ wide, shorter than the stem; bracts very unequal, sometimes purplish, the lower one usually about twice as long as the upper; flowers 6″–8″ broad; pedicels erect, about 8″ long, shorter than the lower bract; capsule subglobose, 2″–3″ in diameter; seeds large, ½″–¾″ long, somewhat obovoid, faintly pitted or nearly smooth, brown.

In fields and meadows, Newfoundland to British Columbia, Virginia, Kansas and Colorado. May–Aug.

Family 26. MARANTÀCEAE Lindl. Nat. Syst. 1830.

Arrowroot Family.

Tall herbs, perennial by rootstocks or tubers, or sometimes annual, with scapose or leafy stems, mostly large entire long-petioled sheathing leaves, often swollen at the base of the blade, the veins pinnate, parallel. Flowers perfect or sometimes polygamous, irregular, in panicles, racemes or spikes. Perianth superior, its segments distinct to the summit of the ovary or united into a tube, normally in 2 series of 3, the outer (sepals) usually different from the inner (petals). Perfect stamen 1; anthers 1–2-celled. Staminodia mostly 5, often petal-like, separate or united by their bases, very irregular. Ovary 1–3-celled, inferior; ovule 1 in each cavity, anatropous; style slender, curved, terminal; stigma simple. Fruit capsular or berry-like, 1–3-celled. Seed solitary in each cavity. Embryo central, in copious endosperm.

About 12 genera and 160 species, mostly in the tropics, a few in warm-temperate regions.

1. THÀLIA L. Sp. Pl. 1193. 1753.

Annual (or perennial?) herbs, with large long-petioled basal leaves, erect simple scapes and terminal panicled spikes of bracted usually purple flowers. Sepals 3, membranous, separate, equal. Petals 3, separate or somewhat coherent at the base. Staminodia slightly united below, one of them (labellum) broad, crested. Anther 1-celled. Ovary 1-celled or with 2 additional small empty cavities. Base of the style aduate to the base of the stamen-tube. Stigma 2-lipped, dorsally appendaged. Capsule globose or ovoid. Seed solitary, erect. Embryo strongly curved. [In honor of Johann Thalius, German naturalist of the sixteenth century.]

About 7 species, all American. Besides the following, another occurs in the Southern States.

1. Thalia dealbàta Roscoe. Powdery Thalia. (Fig. 1086.)

Thalia dealbata Roscoe, Trans. Linn. Soc. 8: 340. 1807.

Plant finely white-powdery nearly all over. Scapes rather stout, terete, 3°–6° tall; petioles 1°–2½° long, terete; leaves ovate-lanceolate, acute or acuminate at the apex, rounded, narrowed or subcordate at the base, ½°–1° long, 3′–5′ wide; panicle 8′–18′ long, its spikes numerous, usually erect or ascending; bracts of the panicle narrow, deciduous, not longer than the spikes; bractlets ovate, unequal, coriaceous, about ½′ long; flowers purple, longer than the bractlets; capsule ovoid, about 4″ in diameter.

In ponds and swamps, South Carolina to Louisiana, Missouri and Texas.

Family 27. BURMANNIÀCEAE Blume, Enum. Pl. Jav. 1: 27. 1830.*

BURMANNIA FAMILY.

Low annual herbs, with filiform stems and fibrous roots. Leaves basal or reduced to cauline scales or bracts. Flowers regular, perfect, the perianth with 6 small thick lobes, its tube adnate to the ovary. Stamens 3 or 6, included, inserted on the tube of the perianth; anthers 2-celled, the sacs transversely dehiscent. Style slender; stigmas 3, dilated; ovary inferior, with 3 central or parietal placentae. Ovules numerous. Capsule many-seeded. Seeds minute, oblong; endosperm none.

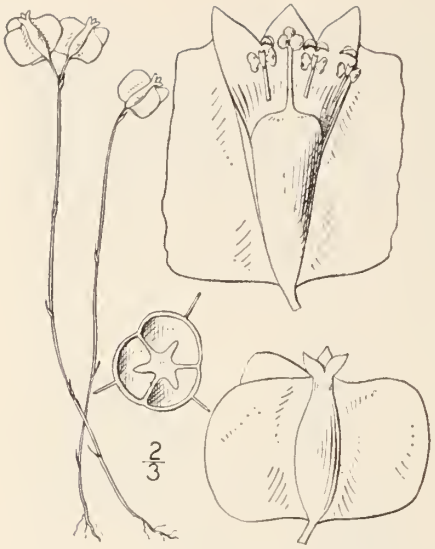
Ten genera and about 60 species, widely distributed in tropical regions. The family is represented in North America by the following genus and *Apteria* of the Gulf States.

1. BURMÁNNIA L. Sp. Pl. 287. 1753.

Erect herbs, with simple stems and small alternate scale-like or bract-like leaves. Tube of the perianth strongly 3-angled or 3-winged, the 3 outer lobes longer than the inner. Stamens 3, opposite the inner perianth-lobes. Filaments very short; connective of the anthers prolonged beyond the sacs into a 2-cleft crest. Ovary 3-celled, with 3 thick 2-lobed central placentae; stigmas globose or 2-lobed. Capsule crowned by the persistent perianth, opening by irregular lateral ruptures. [In honor of Johann Burmann, Dutch botanist of the eighteenth century.]

About 20 species, natives of warm regions. Besides the following another occurs in the southeastern States.

* Text contributed by the late Rev. THOMAS MORONG.



1. **Burmannia biflòra** L. Northern Burmannia. (Fig. 1087.)

Burmannia biflora L. Sp. Pl. 287. 1753.

Tripterella coerulea Nutt. Gen. 1: 22. 1818.

Stems very slender, 2′–6′ high, from a few fibrous roots, simple or forked above. Flowers 1 or several, often 2, terminal. Angles of the perianth-tube conspicuously winged, the outer lobes ovate, acute, the inner linear and incurved; seeds very numerous, oblong-linear, sparingly striate, escaping through irregular fissures in the sides of the capsule.

In swamps and bogs, Virginia to Florida and Louisiana. Sept.–Nov.

Family 28. **ORCHIDÀCEAE** Lindl. Nat. Syst. Ed. 2, 336. 1836.*

ORCHID FAMILY.

Perennial herbs, with corms, bulbs or tuberous roots, sheathing entire leaves, sometimes reduced to scales, the flowers perfect, irregular, bracted, solitary, spiked or racemed. Perianth superior, of 6 segments, the 3 outer (sepals) similar or nearly so, 2 of the inner ones (petals) lateral, alike; the third inner one (lip) dissimilar, often markedly so, usually larger, often spurred, sometimes inferior by torsion of the ovary or pedicel. Stamens variously united with the style into an unsymmetrical column; anther 1 or in *Cypripedium* 2, 2-celled; pollen in 2–8 pear-shaped usually stalked masses (pollinia), united by elastic threads, the masses waxy or powdery, attached at the base to a viscid disk (gland). Style often terminating in a beak (rostellum) at the base of the anther or between its sacs. Stigma a viscid surface, facing the lip beneath the rostellum, or in a cavity between the anther-sacs (clinandrium). Ovary inferior, usually long and twisted, 3-angled, 1-celled; ovules numerous, anatropous, on 3 parietal placentae. Capsule 3-valved. Seeds very numerous, minute, mostly spindle shaped, the loose coat hyaline, reticulated; endosperm none; embryo fleshy.

About 410 genera and 5000 species, of wide distribution, most abundant in the tropics, many of those of warm regions epiphytes.

Anthers 2; lip a large inflated sac. — 1. *Cypripedium.*

Anthers solitary.

Anther-sacs divergent; pollinia with a caudicle which is attached at base to a viscid disk or gland.

Glands enclosed in a pouch. — 2. *Orchis.*

Glands not enclosed in a pouch. — 3. *Habenaria.*

Anther-sacs parallel; pollinia not produced into a caudicle (except apparently in no. 14).

Pollinia granulose or powdery.

Flowers solitary or few; anther incumbent on a column 4″ long or less.

Lip crested with straight, somewhat fleshy hairs.

Column clavate; lip free. — 4. *Pogonia.*

Column linear, dilated above, the lip adherent to its base. — 5. *Arethusa.*

Lip bearded with long club-shaped hairs. — 15. *Limodorum.*

Flowers numerous, in spikes or racemes; anther erect, jointed to a column not over 2″ long.

Anther operculate; leaves broad, alternate. — 6. *Epipactis.*

Anther not operculate.

Leaves green, borne on the stem.

Leaves alternate; spike mostly twisted. — 7. *Gyrostachys.*

Leaves 2, opposite; spike not twisted. — 8. *Listera.*

Leaves white-reticulated, basal. — 9. *Peramium.*

Pollinia smooth and waxy.

Plants with corms or solid bulbs; leaves basal or cauline.

Leaves unfolding before or with the flowers.

Leaf cauline; lip ovate, or auricled at the base. — 10. *Achroanthes.*

Leaf or leaves basal.

Leaves 2; lip flat; flowers racemed. — 11. *Leptorchis.*

Leaf 1; lip saccate; flower solitary. — 12. *Calypso.*

*Text contributed by the late Rev. THOMAS MORONG.

Leaf 1, basal, unfolding after the flowering time.
Flowers long-spurred; lip 3-lobed. 14. *Tipularia.*
Flowers not spurred; lip 3-ridged. 17. *Aplectrum.*
Plants with coralloid roots, bulbless, the leaves reduced to scales.
Pollinia 4, in 2 pairs; flowers gibbous or spurred. 13. *Corallorhiza.*
Pollinia 8, united; flowers not gibbous nor spurred. 16. *Hexalectris.*

1. CYPRIPÈDIUM L. Sp. Pl. 951. 1753.

Glandular-pubescent herbs, with leafy stems or scapes and tufted roots of thick fibres. Leaves large, broad, many-nerved. Flowers solitary or several, drooping, large, showy. Sepals spreading, separate, or 2 of them united under the lip. Lip a large inflated sac. Column declined, bearing a sessile or stalked anther on each side and a dilated petaloid sterile stamen above, which covers the summit of the style. Pollinia granular, without a caudicle or glands. Stigma terminal, broad, obscurely 3-lobed. [Name Greek, Venus' sock or buskin.]

About 40 species, natives of temperate and tropical regions. Besides the following, some 4 others occur in western North America.

Sepals separate; stem leafy, 1-flowered. 1. *C. arietinum.*
Lateral sepals more or less united.
Plant 2-leaved; scape 1-flowered. 2. *C. acaule.*
Stem leafy to the top, 1–several-flowered.
Sepals and petals not longer than the lip. 3. *C. reginae.*
Sepals and petals longer than the lip.
Sterile stamen lanceolate; lip white. 4. *C. candidum.*
Sterile stamen triangular; lip yellow.
Lip 1¼′–2′ long, pale yellow. 5. *C. hirsutum.*
Lip 7″–15″ long, bright yellow. 6. *C. parviflorum.*

1. Cypripedium arietìnum R. Br. Ram's-head Ladies' Slipper. (Fig. 1088.)

Cypripedium arietinum R. Br. in Ait. Hort. Kew. Ed. 2, 5: 222. 1813.

Stem 8′–12′ high, 1-flowered. Leaves 3 or 4, elliptic or lanceolate, 2′–4′ long, ½′–3′ wide; sepals separate, lanceolate, 8″–10″ long, longer than the lip; petals linear, greenish brown, about as long as the sepals; lip 7″–8″ long, red and white, veiny, prolonged at the apex into a long blunt spur, somewhat distorted at the upper end which resembles a ram's head, whence the specific name.

In cold and damp woods, Quebec to Ontario, New York and Minnesota. May–Aug.

2. Cypripedium acaùle Ait. Moccasin Flower. Noah's Ark. Stemless Ladies' Slipper. (Fig. 1089.)

Cypripedium acaule Ait. Hort. Kew. 3: 303. 1789.

Scape 6′–12′ high, 1-flowered. Leaves 2, basal, elliptic, 6′–8′ long, 2′–3′ wide, thick; occasionally a smaller leaf is borne on the scape; sepals greenish purple, spreading, 1½′–2′ long, lanceolate, the 2 lateral ones united; petals narrower and somewhat longer than the sepals; lip often over 2′ long, somewhat obovoid, folded inwardly above, pink with darker veins or sometimes white, the upper part of its interior surface crested with long white hairs; sterile stamen triangular, acuminate, keeled inside.

In sandy or rocky woods, Newfoundland to Ontario, south to North Carolina, Kentucky and Minnesota. Ascends to 4500 ft. in Virginia. The hairs on the lower part of the bract and on the base of the ovary are often tipped with scarlet glands. Flower fragrant. May–June.

3. Cypripedium regìnae Walt. Showy Ladies' Slipper. (Fig. 1090.)

Cypripedium reginae Walt. Fl. Car. 222. 1788.

Cypripedium album Ait. Hort. Kew. 3: 303. 1789.

Cypripedium spectabile Salisb. Trans. Linn. Soc. 1: 78. 1791.

Stem stout, 1°–2° high, leafy to the top. Leaves elliptic, acute, 3′–7′ long, 1′–4′ wide. flowers 1–3; sepals round-ovate, white, not longer than the lip, the lateral ones united for their whole length; petals somewhat narrower than the sepals, white; lip much inflated, over 1′ long, variegated with purple and white stripes; stamen cordate-ovate.

In swamps and woods, Nova Scotia to Ontario and Minnesota, south to Georgia. June-Sept.

4. Cypripedium cándidum Willd. Small White Ladies' Slipper. (Fig. 1091.)

Cypripedium candidum Willd. Sp. Pl. 4: 142. 1805.

Stem 6′–12′ high, leafy. Leaves 3 or 4, elliptic or lanceolate, acute or acuminate, 3′–5′ long, 8″–16″ wide, with several obtuse sheathing scales below them; bracts 1′–2′ long, lanceolate; flower solitary; sepals lanceolate, longer than the lip, greenish, purple spotted; petals somewhat longer and narrower than the sepals, wavy-twisted, greenish; lip white, striped with purple inside, about 10″ long; sterile stamen lanceolate.

In bogs and meadows, New York and New Jersey to Minnesota and Missouri. May–July.

5. Cypripedium hirsùtum Mill. Large Yellow Ladies' Slipper. (Fig. 1092.)

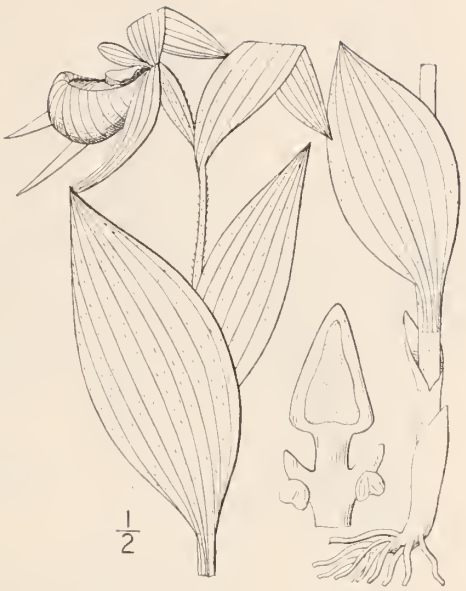
Cypripedium hirsutum Mill. Gard. Dict. Ed. 8, no. 3. 1768.

Cypripedium pubescens Willd. Sp. Pl. 4: 143. 1805.

Stems leafy, 1°–2° high. Leaves oval or elliptic, 3′–5′ long, 1½′–3′ wide, acute or acuminate; sepals ovate-lanceolate, usually longer than the lip, yellowish or greenish, striped with purple; petals narrower, usually twisted; lip much inflated, 1′–2′ long, pale yellow with purple lines; its interior with a tuft of white jointed hairs at the top; sterile stamen triangular; stigma thick, somewhat triangular, incurved.

In woods and thickets, Nova Scotia to Ontario and Minnesota, south to Alabama and Nebraska. Ascends to 4000 ft. in Virginia. Petals often elongated. May–July.

6. Cypripedium parviflòrum Salisb. Small Yellow Ladies' Slipper. (Fig. 1093.)



Cypripedium parviflorum Salisb. Trans. Linn. Soc. 1: 77. 1791.

Stems 1°–2° high, slender, leafy. Leaves oval, elliptic or lanceolate, 2′–6′ long, 1′–2¼′ wide; sepals and petals longer than the lip; petals usually twisted; lip 7″–15″ long, bright yellow, more or less marked with purple stripes, spots or blotches; sterile stamen triangular, yellow and purple spotted like the lip.

In woods and thickets, Newfoundland to British Columbia and Washington, south along the mountains to Georgia, and to Missouri. Ascends to 4000 ft. in Virginia. Similar to the preceding species, with which it appears to intergrade, or of which it may be but a form, but usually distinguished by the smaller size and brighter yellow color of the lip. Sepals and petals sometimes purple. May–July.

2. ÓRCHIS L. Sp. Pl. 939. 1753.

Roots of numerous fleshy fibres, stems in our species scape-like, 1–2-leaved at the base. Flowers in short terminal spikes. Sepals separate, subequal, spreading or connivent. Petals similar to the sepals. Lip connate with the base of the column, produced below into a spur. Column short, scarcely extending beyond the base of the lip. Anther 2-celled, the sacs contiguous and slightly divergent; pollinia granulose, 1 large mass in each sac, produced into a slender caudicle, the end of which is attached to a small gland. Stigma a hollowed surface between the anther-sacs, the rostellum a knob-like projection under the anther. Glands enclosed in a pouch. Capsule oblong, erect, without a beak. [Name ancient.]

About 80 species, natives of the north temperate zone. Only the following are known in North America.

Plant 2-leaved at the base. 1. *O. spectabilis.*
Plant 1-leaved at the base. 2. *O. rotundifolia.*

1. Orchis spectábilis L. Showy Orchis. (Fig. 1094.)

Orchis spectabilis L. Sp. Pl. 943. 1753.

Stems 4′–12′ high, thick, fleshy, 5-angled. Leaves 2, near the base of the stem, with 1 or 2 scales below them, obovate, sometimes 8′ long and 4′ wide, but usually smaller, clammy to the touch; spike 3–6-flowered; flowers about 1′ long, violet-purple mixed with lighter purple and white; bracts foliaceous, sheathing the ovaries; sepals united in an arching galea; petals connivent under the sepals, more or less attached to them; lip whitish, divergent, entire, about as long as the petals; spur obtuse, about 8″ long; column violet on the back; capsule about 1′ long, strongly angled.

In rich woods, New Brunswick to Ontario and Minnesota, south to Georgia, Kentucky and Nebraska. Ascends to 4000 ft. in Virginia. April–June.

2. Orchis rotundifòlia Pursh. Small Round-leaved Orchis. (Fig. 1095.)

Orchis spectabilis Pursh. Fl. Am. Sept. 588 1814.

Platanthera rotundifolia Lindl. Gen. & Sp. Orch. 292. 1835.

Stem slender, 8′–10′ high, 1-leaved near the base. Leaf varying from nearly orbicular to oval, 1½′–3′ long, 1′–2′ wide, with 1 or 2 sheathing scales below it; spike 2–6-flowered; flowers 6″–8″ long, subtended by small bracts; lateral sepals spreading, sometimes longer than the petals; sepals and petals oval, rose-color; lip white, purple spotted, longer than the petals, 3-lobed, the middle lobe larger, dilated, 2-lobed or notched at the apex; spur slender, shorter than the lip.

In damp woods, Greenland to the Rocky Mountains, Maine, New York and Minnesota. June–July.

3. HABENÀRIA Willd. Sp. Pl. 4: 44. 1805.

Herbs, with thick fibrous or tuberous roots, our species with leafy stems. Flowers greenish, white, purple or yellow, mostly in spikes or racemes. Sepals equal or nearly so, separate, or coherent at the base, the lateral ones usually spreading. Petals mostly smaller than the sepals; lip spreading, or drooping, with a spur at its base, entire, or 3–5-cleft, or lacerate. Column very short. Anther-sacs elevated, more or less divergent. Pollinia coarsely granular; caudicles short; glands naked. [Latin; a rein or strap.]

About 400 species, widely distributed. Besides the following, some 20 others occur in the southern and western parts of North America.

- Leaves only 2, basal.
  - Scape bracted. — 1. *H. orbiculata.*
  - Scape naked. — 2. *H. Hookeriana.*
- Leaf solitary. — 3. *H. obtusata.*
- Leaves several or numerous.
  - Lip not 3-parted.
    - Lip entire.
      - Ovary not twisted. — 4. *H. nivea.*
      - Ovary more or less twisted.
        - Lip lanceolate; flowers greenish yellow. — 5. *H. hyperborea.*
        - Lip rhombic, dilated at the base; flowers white. — 6. *H. dilatata.*
    - Lip crenulate or erose-dentate; flowers orange-yellow. — 7. *H. integra.*
    - Lip 2–3-toothed.
      - Lip toothed at the apex.
        - Spur sac-like, shorter than the ovary. — 8. *H. bracteata.*
        - Spur slender, longer than the ovary. — 9. *H. clavellata.*
      - Lip with an obtuse tooth on each side at the base, and a central tubercle. — 10. *H. flava.*
    - Lip pectinately fringed.
      - Spur half as long as the ovary; flowers yellow. — 11. *H. cristata.*
      - Spur longer than the ovary.
        - Flowers bright yellow. — 12. *H. ciliaris.*
        - Flowers white. — 13. *H. blepharioglottis.*
  - Lip 3-parted.
    - Segments of the lip deeply fringed.
      - Segments narrow; fringe of a few threads. — 14. *H. lacera.*
      - Segments broadly fan-shaped; fringe copious.
        - Segments fringed to the middle; flowers white. — 15. *H. leucophaea.*
        - Segments fringed to about one-third or less; flowers lilac.
          - Raceme 2′–2½′ thick; lip ½′–1′ broad. — 16. *H. grandiflora.*
          - Raceme 1′–1½′ thick; lip 4″–6″ broad. — 17. *H. psycodes.*
    - Segments of the lip cut-toothed; flowers violet-purple. — 18. *H. peramoena.*

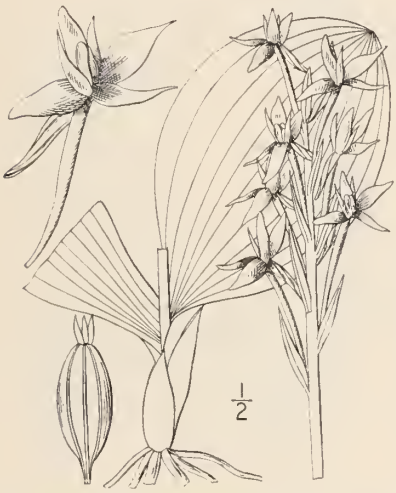
1. Habenaria orbiculàta (Pursh) Torr. Large Round-leaved Orchis. (Fig. 1096.)

Orchis orbiculata Pursh, Fl. Am. Sept. 588. 1814.
Habenaria orbiculata Torr. Comp. 318. 1826.

Scape stout, bracted, 1°–2° high, occasionally bearing a small leaf. Basal leaves 2, orbicular, spreading flat on the ground, shining above, silvery beneath, 4′–7′ in diameter; raceme loosely many-flowered; pedicels nearly ½′ long, the fruiting ones erect; flowers greenish white; upper sepal short, rounded; lateral sepals spreading, falcate-ovate, obtuse 4″–5″ long; petals smaller; lip oblong-linear, entire, obtuse, white, about 6″ long; spur much longer than the ovary, often 1½′ long; anther-sacs prominent, converging above; glands small, orbicular, nearly ¼′ apart, their faces turned toward the axis.

In rich woods, Newfoundland to British Columbia, south to North Carolina and Minnesota. Ascends to 4500 ft. in Virginia. July–Aug.

2. Habenaria Hookeriàna A. Gray. Hooker's Orchis. (Fig. 1097.)

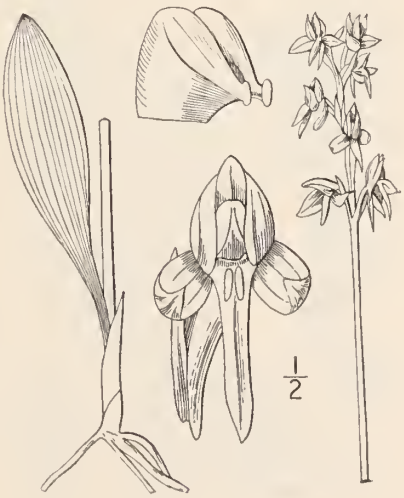


Habenaria Hookeriana A. Gray, Ann. Lyc. N. Y. 3: 229. 1836.
Habenaria orbiculata Goldie, Edinb. Phil. Journ. 6: 331. 1822. Not *Orchis orbiculata* Pursh, 1814.
Habenaria Hookeri var. *oblongifolia* Paine, Cat. Pl. Oneida. 83. 1865.

Scape 8′–15′ high, not bracted. Leaves 2, basal, fleshy, shining, spreading or ascending, oval, orbicular or obovate, 3′–5½′ long; raceme rather loosely many-flowered, 4′–8′ long; bracts acute, about as long as the yellowish green flowers; lateral sepals greenish, lanceolate, acute, spreading, about 4″ long; petals narrowly linear or awl-shaped; lip linear-lanceolate, acute, 4″–5″ long; anther-sacs widely diverging below; glands small, their faces turned inward; spur slender, acute, 8″ long or more, as long as the ovary or considerably longer.

In woods, Nova Scotia to Minnesota, south to New Jersey, Pennsylvania and Iowa. June–Sept.

3. Habenaria obtusàta (Pursh) Richards. Small Northern Bog Orchis. (Fig. 1098.)



Orchis obtusata Pursh. Fl. Am. Sept. 588. 1814.
Habenaria obtusata Richards, App. Frank. Journ. 750. 1823.

Scape slender, naked, 4′–10′ high, 4-angled. Leaf solitary, basal, obovate, 2′–5′ long, 5″–12″ wide; spike 1′–2½′ long, loose flowers greenish yellow, about 3″ long; upper sepal erect, round-ovate, green with whitish margins; lateral sepals spreading, oblong, obtuse; petals shorter, dilated or obtusely 2-lobed at the base, connate with the base of the column; lip entire, lanceolate, obtuse, deflexed, about 3″ long; spur about as long as the lip, slender, nearly straight, blunt; anther-sacs widely divergent below, glands small, rather thick.

In bogs, New Brunswick to British Columbia, south to Maine, New York and Colorado. July–Sept.

4. Habenaria nívea (Nutt.) Spreng. Southern Small White Orchis. (Fig. 1099.)

Orchis nivea Nutt. Gen. 2: 188. 1818.
Habenaria nivea Spreng. Syst. 3: 689. 1826.

Stem slender, angled, 12′–15′ high. Leaves linear-lanceolate, acuminate, 4′–8′ long, the upper much shorter and passing into the bracts of the spike; spike 2′–4′ long, loosely many-flowered; flowers small, white; lateral sepals broadly oblong, dilated or slightly eared at the base, spreading, about 3″ long; petals and upper sepal smaller; spur capillary, as long as the ovary or longer; stigma appendaged by 2 small horns affixed to the back of the anther; ovary straight.

In pine barren bogs, Delaware to Florida and Alabama. Aug.

5. Habenaria hyperbòrea (L.) R. Br. Tall Leafy Green Orchis. (Fig. 1100.)

Orchis hyperborea L. Mant. 121. 1767.
Habenaria hyperborea R. Br. in Ait. Hort. Kew. Ed. 2, 5: 193. 1813.

Stem rather stout, 8′–3° high. Leaves lanceolate, mostly acute, 2′–12′ long, 6″–18″ wide; spike narrow, 3′–8′ long; flowers small, greenish or greenish yellow; sepals and petals ovate, obtuse, 2″–3″ long; upper sepal slightly crenulate at the apex; lip lanceolate, entire, obtuse, about 3″ long; spur about equalling the lip, shorter than the ovary, blunt, slightly incurved, sometimes clavate; anther-sacs parallel, diverging at the base; glands small; ovary more or less twisted.

In bogs and wet woods, Nova Scotia to Alaska, south to New Jersey, Colorado and Oregon. Ascends to 4000 ft. in Vermont. May–Aug.

6. Habenaria dilatàta (Pursh) Hook. Tall White Bog Orchis. (Fig. 1101.)

Orchis dilatata Pursh, Fl. Am. Sept. 588. 1814.
Habenaria dilatata Hook. Exot. Fl. 2: *pl. 95.* 1825.

Stem slender, leafy, 1°–2° high. Leaves lanceolate, 3′–12′ long, 3″–10″ wide, obtuse or acute; spike 2′–10′ long; bracts acute, the lower longer than the ovary, the upper shorter; flowers small, white; sepals ovate, obtuse, nearly 3″ long; lip entire, dilated or obtusely 3-lobed at the base, obtuse at the apex, about as long as the blunt incurved spur; anther-sacs nearly parallel; glands close together, strap-shaped, nearly as long as the pollinia and caudicle; stigma with a trowel-shaped beak between the bases of the anther-sacs; ovary more or less twisted.

In bogs and wet woods, Nova Scotia to Alaska, south to Maine, New York, Utah and Oregon. Ascends to 5000 ft. in New Hampshire. June–Sept.

7. Habenaria íntegra (Nutt.) Spreng. Small Southern Yellow Orchis. (Fig. 1102.)

Orchis integra Nutt. Gen. 2: 188. 1818.
Habenaria integra Spreng. Syst. 3: 689. 1826.

Stem 1°–2° high, angled, with 1–3 linear-lanceolate leaves below, and numerous bract-like ones above. Lower leaves 2′–8′ long, acute; spike 1′–3′ long, densely flowered; flowers orange-yellow; upper sepals and petals connivent; lateral sepals longer, oval or obovate, spreading; lip oblong, mostly crenulate or erose, sometimes entire; spur straight, longer than the lip, shorter than the ovary; stigma with 2 lateral fleshy appendages and a narrow beak.

In wet pine barrens, New Jersey to Florida and Louisiana. The upper surface of the leaves is often reticulated with hexagonal cells. July.

8. Habenaria bracteàta (Willd.) R. Br. Long-bracted Orchis. (Fig. 1103.)

Orchis bracteata Willd. Sp. Pl. 4: 34. 1805.
Habenaria bracteata R. Br. in Ait. Hort. Kew. Ed. 2, 5: 192. 1813.
Habenaria viridis var. *bracteata* Reichenb. Ic. Fl. Germ. 13: 130. *f.* 435. 1851.

Stem slender or stout, leafy, 6′–2° high. Leaves lanceolate, ovate or oval, or the lowest sometimes obovate, obtuse or acute, 2′–5′ long, the upper much smaller; bracts longer than the ovaries, the lower ones 2 or 3 times as long; spike 3′–5′ long, loosely flowered; flowers green or greenish; sepals ovate-lanceolate, spreading, dilated or somewhat gibbous at the base, about 3″ long; petals very narrow, sometimes thread-like; lip 3″–4″ long, oblong-spatulate, 2–3-toothed or lobed at the apex, more than twice as long as the white sac-like spur; anther-sacs divergent at the base.

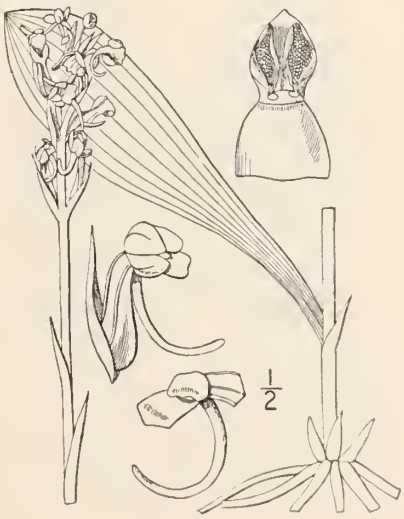
In woods and meadows, New Brunswick to British Columbia, south to North Carolina and Nebraska. Also in Europe. Ascends to 3600 ft. in Virginia. May–Sept.

9. Habenaria clavellàta (Michx.) Spreng. Small Green Wood Orchis. (Fig. 1104.)

Orchis clavellata Michx. Fl. Bor. Am. 2: 155. 1803.
Orchis tridentata Willd. Sp. Pl. 4: 41. 1805.
Habenaria tridentata Hook. Exot. Fl. 2: *pl.* 81. 1825.
Habenaria clavellata Spreng. Syst. 3: 689. 1826.

Stem 8′–18′ high, angled, 1-leaved near the base, often with several small bract-like leaves above, or one of these larger. Basal leaf oblanceolate, 2′–6′ long; bracts shorter than the ovaries; spikes ½′–2′ long, loosely flowered; flowers small, greenish or whitish; sepals and petals ovate, lip dilated and 3-toothed at the apex, the teeth often small and inconspicuous; spur longer than the ovary, incurved, clavate; stigma with 3 club-shaped appendages; anther-sacs nearly parallel; capsule ovoid, 3″–4″ long, nearly erect.

In wet or moist woods, Newfoundland to Minnesota, south to Florida and Louisiana. Ascends to 6000 ft. in North Carolina. July–Aug.



10. Habenaria flàva (L.) A. Gray. Tubercled Orchis. Small Pale-green Orchis. (Fig. 1105.)

Orchis flava L. Sp. Pl. 942. 1753.
Orchis virescens Willd. Sp. Pl. 4: 37. 1805.
Habenaria virescens Spreng. Syst. 3: 688. 1826.
Habenaria flava A. Gray, Am. Journ. Sci. 38: 308. 1840.

Stem rather stout, 1°–2° high, leafy. Leaves lanceolate or elliptic, acute or obtuse, 4′–12′ long, 8″–3′ wide; spike 2′–6′ long; bracts acuminate, longer than the ovaries; petals greenish; sepals and petals ovate or roundish, about 3″ long; sepals greenish yellow, lip a little longer than the petals, entire or crenulate, with an obtuse tooth on each side and a central tubercle at the middle of the base; anther-sacs parallel, the sides forming a rounded cavity, in which lie the orbicular incurved glands; capsule about 4″ long.

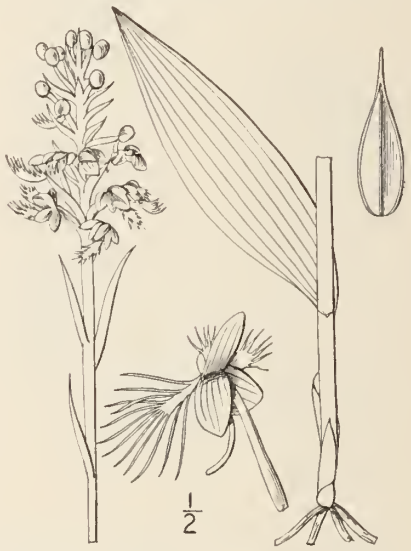
In moist soil, Ontario to Minnesota, south to Florida and Louisiana and Missouri. June–July.

11. Habenaria cristàta (Michx.) R. Br. Crested Yellow Orchis. (Fig. 1106.)

Orchis cristata Michx. Fl. Bor. Am. 2: 156. 1803.
Habenaria cristata R. Br. in Ait. Hort. Kew. Ed. 2, 5: 194. 1813.

Stem slender, angled, 8′–2° high. Leaves narrowly lanceolate, 2′–8′ long, 3″–8″ wide, the upper much smaller, similar to the bracts; bracts as long as the flowers; spike 2′–4′ long, dense; flowers orange; sepals roundish-ovate, about 1½″ long, the lateral ones spreading; petals narrower, pectinate-fringed; lip slightly longer than the sepals, not 3-parted, but deeply fringed to the middle or beyond; spur 2″–3″ long, about half as long as the ovary; anther-sacs divergent at the base, widely separated.

In bogs, New Jersey to Florida and Louisiana. July–Aug.



12. Habenaria ciliàris (L.) R. Br. Yellow Fringed Orchis. (Fig. 1107.)

Orchis ciliaris L. Sp. Pl. 939. 1753.
Habenaria ciliaris R. Br. in Ait. Hort. Kew. Ed. 2, 5: 194. 1813.

Stem slender, 1°–2½° high. Leaves lanceolate, acute, 4′–8′ long, 6″–18″ wide, the upper smaller; spike closely many-flowered, 3′–6′ long, sometimes nearly 3′ thick; flowers orange or yellow, large, showy; sepals orbicular or broadly ovate, oblique at the base, 2″–4″ long; the lateral ones mostly reflexed; petals much smaller, oblong or cuneate, usually toothed; lip oblong, 5″–7″ long, copiously fringed more than halfway to the middle; spur 1′–1½′ long, very slender; anther-sacs large, divergent at the base, bearing a small white tubercle on the outer side.

In meadows, Vermont (?) and Ontario to Michigan, south to Florida and Texas. July–Aug.

13. Habenaria blephariglóttis (Willd.) Torr. White Fringed Orchis. (Fig. 1108.)

Orchis ciliaris var. *alba* Michx. Fl. Bor. Am. 2: 156. 1803. Not *O. alba* Lam. 1778.
Orchis blephariglottis Willd. Sp. Pl. 4: 9. 1805.
Habenaria blephariglottis Torr. Comp. 317. 1826.
Habenaria ciliaris var. *alba* Morong, Bull. Torr. Club, 20: 38. 1893.

Stems and leaves similar to those of the preceding species. Spikes densely or rather loosely many-flowered; flowers pure white, usually a little smaller than those of *H. ciliaris;* lip narrower, oblong; petals toothed or somewhat fringed at the apex; fringe of the lip copious or sparse.

In bogs and swamps, Newfoundland to Minnesota and New Jersey. Intermediate forms between this and the preceding species, with light yellow flowers, are probably hybrids. Blooms a few days earlier than *ciliaris* where the two grow together. July–Aug.

Habenaria blephariglóttis holopétala (Lindl.) A. Gray, Man. Ed. 5, 502. 1867.

Platanthera holopetala Lindl. Gen. & Sp. Orch. 291. 1835.

One or both of the petals entire; lip often sparingly fringed. With the type. Probably a mere form.

14. Habenaria lácera (Michx.) R. Br. Ragged Orchis. (Fig. 1109.)

Orchis lacera Michx. Fl. Bor. Am. 2: 156. 1803.
Habenaria lacera R. Br. Prodr. Fl. Nov. Holl. 1: 312. 1810.

Stem rather slender, 1°–2° high. Leaves firm, lanceolate, 5′–8′ long, 10″–18″ wide, the upper gradually smaller; spike 2′–6′ long, loose; flowers greenish yellow; sepals ovate, obtuse, about 3″ long, the upper one a little broader than the others, petals linear, entire, obtuse, about as long as the sepals; lip 3-parted, the segments narrow, deeply fringed, the fringe of a few threads, about ½′ long; spur 7″–8″ long, curved, shorter than the ovary, clavate at the apex; anther-sacs divergent at the base, their bases beaked and projecting upward; glands oblong-linear, hyaline, as long as the caudicle.

In swamps and wet woods, Nova Scotia to Minnesota, south to Georgia and Missouri. June–July.

15. Habenaria leucophaèa (Nutt.) A. Gray. Prairie White-fringed Orchis. (Fig. 1110.)

Orchis leucophaea Nutt. Trans. Am. Phil. Soc. (II.) 5: 161. 1833–37.
Habenaria leucophaea A. Gray, Man. Ed. 5, 502. 1867.

Stem stout, angled, 1½°–2½° high. Leaves lanceolate, 4′–8′ long; spike 3′–5′ long, very thick, loosely flowered; flowers large, white, fragrant, sometimes tinged with green; sepals broadly ovate; petals obovate, minutely cut toothed, about 3″ long; lip 3-parted, 6″–7″ long, the segments broadly wedge-shaped and copiously fringed. Spur 1′–1½′ long, longer than the ovary; anther-sacs widely diverging at the base; caudicles long and slender; glands transversely oval; ovary often recurved.

On moist prairies, western New York to Minnesota, Kentucky and Arkansas. July.

16. Habenaria grandiflòra (Bigel.) Torr. Large Purple-fringed Orchis. (Fig. 1111.)

Orchis grandiflora Bigel. Fl. Bost. Ed. 2, 321. 1824.
Orchis fimbriata Willd. Sp. Pl. 4: 39. 1805. Not Dryand. 1789.
Habenaria grandiflora Torr. Comp. 319. 1826.
Habenaria fimbriata A. Gray, Man. Ed. 5, 503. 1867. Not R. Br. 1813.

Stem 1°–5° high. Leaves oval or lanceolate, 4′–10′ long, 10″–3′ wide, obtuse, or the upper smaller and acute; raceme 3′–15′ long, sometimes 2½′ thick, densely flowered; flowers lilac or purplish, sometimes white or nearly so, fragrant; upper sepal and petals erect, connivent; petals oblong or oblanceolate, more or less toothed, ½′ long; lip 3-parted, ½′–1′ broad, about ½′ long, the segments broadly fan-shaped, copiously fringed to about the middle, anther-sacs divergent at the base; glands orbicular, turned inward; spur filiform, clavate, 1′–1½′ long.

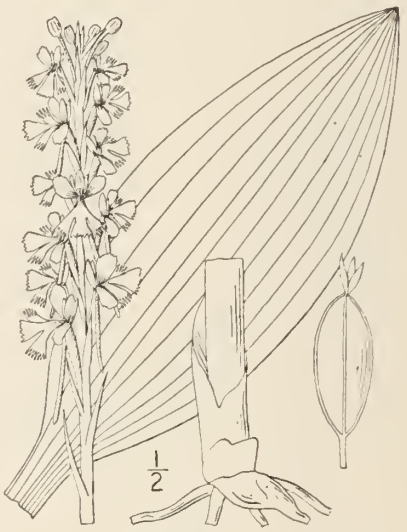
In rich woods and meadows, New Brunswick to Ontario and Michigan, south to North Carolina. June–Aug.

17. Habenaria psycòdes (L.) A. Gray. Smaller Purple-fringed Orchis. (Fig. 1112.)

Orchis psycodes L. Sp. Pl. 943. 1753.
Orchis fimbriata Ait. Hort. Kew. 3: 297. 1789.
Habenaria psycodes A. Gray, Am. Journ. Sci. 38: 310. 1840.

Stem rather slender, 1°–3° high. Leaves oval, elliptic or lanceolate, 2′–10′ long, 8″–3′ wide, the upper smaller; raceme 2′–6′ long, 1′–1½′ thick, loosely or densely several-many-flowered; flowers lilac, rarely white, fragrant; lower sepals ovate, obtuse, about 4″ long, the upper one a little narrower; petals oblong or oblanceolate, toothed on the upper margin; lip 3-parted, 4″–6″ broad, the segments fan-shaped and copiously fringed, the fringe of the middle segment shorter than that of the lateral ones; spur somewhat clavate at the apex, about 8″ long, longer than the ovary.

In meadows, swamps and wet woods, Newfoundland to Minnesota, south to North Carolina and Indiana. Ascends to 6000 ft. in North Carolina. July–Aug.



18. Habenaria peramoèna A. Gray. Fringeless Purple Orchis. (Fig. 1113.)

Orchis fissa Pursh, Fl. Am. Sept. 589. 1814. Not Willd. 1805.
H. peramoena A. Gray, Am. Journ. Sci. 38: 310. 1840.

Stem 1°–2½° high. Leaves elliptic or lanceolate, 4′–8′ long, ½′–1½′ wide, the upper gradually smaller; spike 2′–7′ long, 1′–2½′ thick, densely or rather loosely many-flowered; flowers large, showy, violet-purple; lateral sepals round-ovate, 3″–4″ long, the upper one smaller; petals smaller, round-obovate, clawed, entire, or slightly erose; lip 7″–10″ long, 3-parted, the segments fan-shaped, cut-toothed, not fringed, the middle one 2-lobed; spur about as long as the ovary, curved, clavate; anther-sacs widely divergent, little separated; glands orbicular, oblique.

In moist meadows, New Jersey to Illinois, Virginia and Kentucky. July–Aug.

4. POGONIA Juss. Gen. Pl. 65. 1789.

Mostly low herbs, the flowers terminal, solitary or in racemes, the leaves usually alternate or verticillate. Sepals and petals separate, erect or ascending. Lip erect from the base of the column, spurless. Column elongated, club-shaped at the summit. Anther terminal, stalked, attached to the back of the column, its sacs parallel; pollinia 2, 1 in each sac, powdery-granular, without a caudicle. Stigma a flattened disk below the anther. Capsule oblong or ovoid, erect or drooping. [Greek, bearded, from the bearded lip of some species.]

About 30 species, widely distributed. Only the following are known in North America.

Sepals and petals nearly equal and alike.
- Lip crested. — 1. *P. ophioglossoides.*
- Lip not crested. — 2. *P. trianthophora.*

Sepals longer and narrower than the petals.
- Stem bearing a single leaf near the middle. — 3. *P. divaricata.*
- Stem bearing a whorl of leaves at the top.
  - Lip crested along a narrow line down the face; peduncle as long as the capsule or longer. — 4. *P. verticillata.*
  - Lip crested over the whole face and lobes; peduncle shorter than the capsule. — 5. *P. affinis.*

1. Pogonia ophioglossoides (L.) Ker. Rose Pogonia. Snake-mouth. (Fig. 1114.)

Arethusa ophioglossoides L. Sp. Pl. 951. 1753.

Pogonia ophioglossoides Ker in Lindl. Bot. Reg. *pl. 148.* 1816.

Stem 8′–15′ high, 1–3-leaved, not rarely with a long-petioled basal leaf. Stem leaf or leaves ½′–3′ long, lanceolate or ovate, erect, bluntly acute; flowers fragrant, pale rose-color, slightly nodding, large, solitary or occasionally in pairs, subtended by a foliaceous bract; sepals and petals about equal, elliptic or oval, 6″–10″ long; lip spatulate, free or somewhat appressed to the column below, crested and fringed; column much shorter than the petals, thick, club-shaped.

In meadows and swamps, Newfoundland to Ontario, Florida and Kansas. Also in Japan. Roots fibrous. June–July.

2. Pogonia trianthóphora (Sw.) B.S.P. Nodding Pogonia. (Fig. 1115.)

Arethusa trianthophora Sw. Kongl. Vet. Acad. Handl. (II.) 21: 230. 1800.

Pogonia pendula Lindl. Bot. Reg. *pl. 908.* 1825.

Pogonia trianthophora B.S.P. Prel. Cat. N. Y. 52. 1888.

Stem glabrous, 3′–8′ high, from a tuberous root, often clustered. Leaves 2–8, alternate, ovate, 3″–9″ long, clasping; flowers 1–7, on axillary peduncles, pale purple, at first nearly erect, soon drooping; perianth 6″–8″ long; sepals and petals about equal, connivent, elliptic, obtuse; lip clawed, somewhat 3-lobed, roughish or crisped above, not crested, about as long as the petals; capsule oval, drooping, about 6″ long.

In rich woods, Canada (?), Rhode Island to Florida, Wisconsin and Kansas. Ascends to 3500 ft. in North Carolina. Local. Aug.–Sept.

3. Pogonia divaricàta (L.) R. Br. Spreading Pogonia. (Fig. 1116.)

Arethusa divaricata L. Sp. Pl. 951. 1753.

Pogonia divaricata R. Br. in Ait. Hort. Kew. Ed. 2, 5: 203. 1813.

Stem 1°–2° high, bearing a leaf near the middle, and a foliaceous bract near the flower. Leaf lanceolate, or narrowly elliptic, obtuse, clasping, 2′–4′ long; flower terminal, solitary, about 1′ long; sepals linear, longer and narrower than the petals, diverging dark colored; petals flesh-color, lanceolate, narrowed at the apex, lip as long as the petals, 3-lobed, crenulate or wavy-margined, greenish, veined with purple, crested, but not bearded, the upper lobe long.

In swamps, southern New Jersey to Florida and Alabama. Ascends to 4000 ft. in North Carolina. Reported from Wisconsin. July.

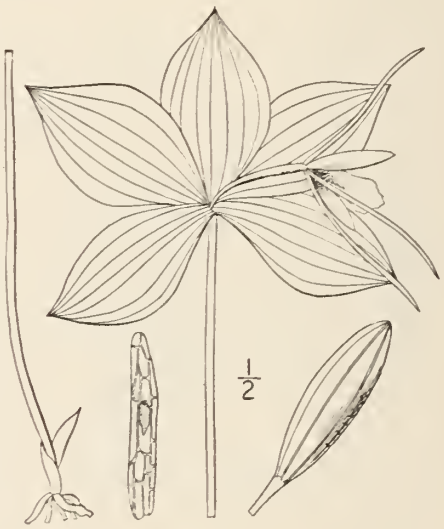
4. Pogonia verticillàta (Willd.) Nutt. Whorled Pogonia. (Fig. 1117.)

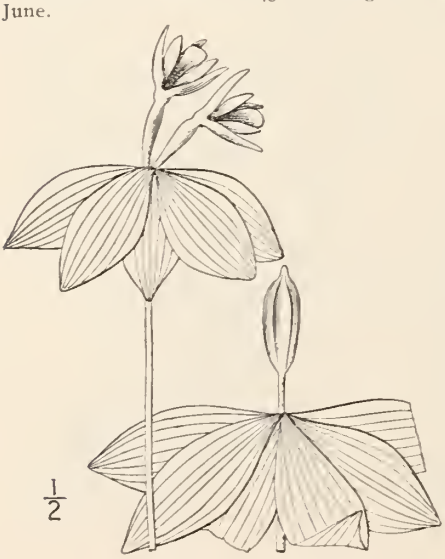
Arethusa verticillata Willd. Sp. Pl. 4: 81. 1805.

Pogonia verticillata Nutt. Gen. 2: 192. 1818.

Stem 10′–12′ high, from long fleshy roots, bearing a whorl of 5 leaves at the summit. Leaves obovate, abruptly pointed at the apex, sessile, 1′–3′ long; flower solitary, erect or declined; peduncle 6″–8″ long, in fruit usually equalling or exceeding the capsule; sepals linear, 1½′–2′ long, about 1″ wide, spreading, dark purple; petals linear, erect, obtuse, greenish yellow, about 10″ long; lip 3-lobed, crested along a narrow band, the upper part expanded, undulate; capsule erect, 1′ or more long.

In moist woods, Ontario to Wisconsin, Indiana and Florida. Ascends to 4500 in Virginia. May–June.





5. Pogonia affinis Austin. Smaller Whorled Pogonia. (Fig. 1118.)

Pogonia affinis Austin; A. Gray, Man. Ed. 5, 507. 1867.

Smaller than the preceding species, stem 8′–10′ high. Leaves in a whorl of 5 at the summit, 1′–2′ long; flowers 2 or solitary, greenish yellow; peduncle 2″–4″ long, much shorter than the ovary and capsule; sepals equalling the petals, or but little longer, somewhat narrowed at the base; lip crested over nearly the whole face and lobes; capsule erect, 1′ long or less.

In moist woods, Connecticut to southern New York and New Jersey. Rare and local. The species is imperfectly known. Our figure is taken from Mr. Austin's original sketches. June.

5. ARETHÙSA L. Sp. Pl. 950. 1753.

Low herbs, with small bulbs and mostly solitary flowers on bracted scapes, the solitary leaf linear, hidden at first in the upper bract, protruding after flowering. Sepals and petals about equal, connivent and hooded above, coherent below. Lip dilated and recurved-spreading at the apex, crested on the face with straight somewhat fleshy hairs, slightly gibbous at the base. Column adherent to the lip below, linear, narrowly winged and dilated at the summit. Anther operculate, of 2 approximated sacs incumbent upon the column; pollinia 4, 2 in each sac, powdery-granular. Capsule erect, ellipsoid, strongly angled. [Dedicated to the nymph Arethusa.]

Two known species, the following occurring in North America, the other in Japan.

1. Arethusa bulbòsa L. Arethusa. (Fig. 1119.)

Arethusa bulbosa L. Sp. Pl. 950. 1753.

Scape glabrous, 5′–10′ high, bearing 1–3 loose sheathing bracts. Leaf linear, many-nerved, becoming 4′–6′ long; flower solitary (rarely 2), arising from between a pair of small unequal scales, rose-purple, 1′–2′ high; sepals and petals linear to elliptic, obtuse, arched over the column; lip usually drooping beneath the sepals and petals, the apex broad, rounded, often fringed or toothed, variegated with purplish blotches, bearded, crested down the face in three white hairy ridges; capsule about 1′ long, ellipsoid, strongly 6-ribbed, rarely maturing.

In bogs, Newfoundland to Ontario and Minnesota, south to North Carolina and Indiana. May–June.

6. EPIPÁCTIS R. Br. in Ait. Hort. Kew. Ed. 2, 5: 201. 1813.

Tall stout herbs with fibrous roots and simple leafy stems. Leaves ovate or lanceolate, plicate, clasping. Flowers leafy-bracted, in terminal racemes. Sepals and petals all separate. Spur none. Lip free, sessile, broad, concave below, constricted near the middle, the upper portion dilated and petal-like. Column short, erect. Anther operculate, borne on the margin of the clinandrium, erect, ovate or semiglobose, its sacs contiguous. Pollinia 2-parted, granulose, becoming attached to the glandular beak of the stigma. Capsule oblong, beakless. [Greek name for Helleborine.]

About 10 species, widely distributed. Besides the following, another occurs in the western United States.

1. Epipactis viridiflòra (Hoffm.) Reichb. Helleborine. (Fig. 1120.)

Serapias viridiflora Hoffm. Deutsch. Fl. 2: 182. 1804.
Epipactis latifolia var. *viridiflora* Irm. Linnaea, 16: 451. 1842.
Epipactis viridiflora Reichb. Fl. Exc. 134. 1830.
Epipactis Helleborine A. Gray, Man. Ed. 6, 504. 1890 Not Crantz. 1769.

Stem 1°–2° high, glabrous below, pubescent above. Leaves ovate or lanceolate, obtuse or acute, 1½′–3′ long, 9″–1½′ wide; flowers greenish yellow to purple; pedicels 2″–3″ long; sepals 4″–5″ long, lanceolate; petals narrower; lip expanded into a slightly undulate apex, tapering to a point; bracts lanceolate, longer than the flowers.

Near Toronto, Ontario; Syracuse and Buffalo, New York; the only American stations known. Widely distributed in Europe. Sometimes confounded with the European *E. latifolia*, but differs in having the lip free from callosities, its apex acute, the sepals and petals longer and more tapering. July–Aug.

7. GYRÓSTACHYS Pers. Syn. 2: 511. 1807.

[SPIRANTHES L. C. Richard, Mem. Mus. Paris, 4: 42. 1818.]

Erect herbs, with fleshy-fibrous or tuberous roots and slender stems or scapes, leaf-bearing below or at the base. Flowers small, spurless, spiked, 1–3-rowed, the spikes more or less twisted. Sepals free, or more or less coherent at the top, or united with petals into a galea. Lip sessile or clawed, concave, erect, embracing the column and often adherent to it, spreading and crisped, or rarely lobed or toothed at the apex, bearing minute callosities at the base. Column arched below, obliquely attached to the top of the ovary. Anther without a lid, borne on the back of the column, erect. Stigma ovate, prolonged into an acuminate beak, at length bifid, covering the anther and stigmatic only underneath. Pollinia 2, 1 in each sac, powdery. Capsule ovoid or oblong, erect, [Greek, referring to the twisted spikes].

About 80 species, widely distributed in tropical and temperate regions. Besides the following, another occurs in the Southern States and one in California. The flowers are often fragrant.

Flowers 3-ranked; stems not twisted, or but slightly so.
- Sepals and petals more or less connivent into a hood. 1. *G. Romanzoffiana.*
- Lateral sepals separate, free.
  - Spike short, about 2′ long, 4″–5″ thick; callosities none, or mere thickenings of the basal margins of the lip. 2. *G. plantaginea.*
  - Spike 4′–6′ long, 6″–10″ thick; callosities nipple-shaped.
    - Spike 6″–7″ thick; callosities hairy, straight. 3. *G. cernua.*
    - Spike 8″–10″ thick; callosities glabrous, incurved. 4. *G. odorata.*

Flowers merely alternate, appearing secund from the spiral twisting of the stem.
- Stem leafy; lower leaves elongated, mostly persistent through the flowering season. 5. *G. praecox.*

Stem a bracted scape; leaves basal, mostly withering before the flowering season.
- Root a single tuber; spike about 1′ long. 6. *G. simplex.*
- Root a cluster of tubers; spike 1′–3′ long. 7. *G. gracilis.*

1. Gyrostachys Romanzoffiàna (Cham.) MacM. Hooded Ladies' Tresses. (Fig. 1121.)

Spiranthes Romanzoffiana Cham. Linnaea, 3: 32. 1828.
Gyrostachys Romanzoffiana MacM. Met. Minn. 171. 1892.

Stem 6′–15′ high, glabrous, leafy below, bracted above, the inflorescence rarely puberulent. Lower leaves 3′–8′ long, linear or linear-oblanceolate; spike 2′–4′ long, 4″–7″ thick; bracts shorter than the flowers; flowers in 3 rows, white or greenish, ringent, 3″–4″ long, spreading horizontally, very fragrant; sepals and petals broad at the base, all more or less connivent into a hood; lip oblong, broad at the base, contracted below the dilated crisped apex, thin, transparent, veined; callosities mere thickenings of the basal margins of the lip, or none.

In bogs, Nova Scotia to Alaska, south to Maine, Pennsylvania, Minnesota and California. July–Aug.

2. Gyrostachys plantagínea (Raf.) Britton. Wide-leaved Ladies' Tresses. (Fig. 1122.)

Neottia plantaginea Raf. Am. Month. Mag. 2: 206. 1818.
Spiranthes cernua var.? *latifolia* Torr. Comp. 320. 1826.
Spiranthes plantaginea Torr. Fl. N. Y. 2: 284. 1843.
S. latifolia Torr.; Lindl. Gen. & Sp. Orch. 467. 1840.
Gyrostachys latifolia Kuntze, Rev. Gen. Pl. 664. 1891.

Stem 4′–10′ high, glabrous or pubescent, bracted above, bearing 4 or 5 lanceolate or oblanceolate leaves below. Leaves 1′–5′ long; spike 1′–2′ long, 4″–5″ thick, dense; floral bracts mostly much shorter than the flowers; flowers spreading, about 3″ long; petals and sepals white; lateral sepals free, narrowly lanceolate, the upper somewhat united with the petals; lip pale yellow on the face, oblong, not contracted in the middle, the wavy apex rounded, crisped or fringed, the base short-clawed; callosities none, or mere thickenings of the lip margins.

Moist banks and woods, New Brunswick to Minnesota, south to Virginia and Michigan. June–Aug.

3. Gyrostachys cérnua (L.) Kuntze. Nodding Ladies' Tresses. (Fig. 1123.)

Ophrys cernua L. Sp. Pl. 946. 1753.
Spiranthes cernua L. C. Rich. Orch. Ann. 37. 1817.
Gyrostachys cernua Kuntze, Rev. Gen. Pl. 664. 1891.

Stem 6′–25′ high (rarely taller), usually pubescent above, mostly bearing 2–6 acuminate bracts. Leaves nearly basal, linear-oblanceolate or linear, 3′–14′ long, the blade narrow, the petiole 2′–10′ long; spike 4′–5′ long, 6″–7″ thick; flowers white or yellowish, fragrant, nodding or spreading, about 5″ long, in 3 rows; lateral sepals free, the upper arching and connivent with the petals; lip oblong, or sometimes ovate, the broad apex rounded, crenulate or crisped; callosities nipple-shaped, straight, hairy.

In wet meadows and swamps, Nova Scotia to Ontario and Minnesota, south to Florida and Louisiana. Aug.–Oct.

4. Gyrostachys odoràta (Nutt.) Kuntze. Fragrant Ladies' Tresses. (Fig. 1124.)

Neottia odorata Nutt. Journ. Acad. Phil. 7: 98. 1834.
Spiranthes odorata Lindl. Gen. & Sp. Orch. 467. 1840.
Gyrostachys odorata Kuntze, Rev. Gen. Pl. 664. 1891.

Stem stout, 1°–2° high, strongly pubescent above. Lower and basal leaves 8′–15′ long, 7″–2′ wide, tapering into sheathing petioles, the upper reduced to bracts; spike 5′–6′ long, 8″–10″ thick, floral bracts often exceeding the flowers, long-acuminate; flowers yellowish white, fragrant, 5″ long; lateral sepals free; lip as long as the petals, oblong, broad at the base, contracted above the middle, the dilated apex crisped or toothed; callosities nipple-shaped, incurved, glabrous.

On river banks, often in the water, North Carolina to Kentucky, Florida and Louisiana. Sept.–Oct.

5. Gyrostachys praècox (Walt.) Kuntze. Grass-leaved Ladies' Tresses. (Fig. 1125.)

Limodorum praecox Walt. Fl. Car. 221. 1788.
Spiranthes graminea var. *Walteri* A. Gray, Man. Ed. 5, 505. 1867.
Spiranthes praecox S. Wats. in A. Gray, Man. Ed. 6, 505. 1890.
Gyrostachys praecox Kuntze, Rev. Gen. Pl. 663. 1891.

Stem slender, 10′–30′ high, glandular-pubescent above, leafy. Leaves linear, 4′–12′ long, with narrow grass-like blades and long sheathing petioles, mostly persistent through the flowering season, the upper smaller; spike usually much twisted, 2′–8′ long, 4″–6″ thick; bracts about as long as the ovaries; flowers white or yellowish, about 4″ long, spreading; lateral sepals free, the upper somewhat connivent with the petals; lip about 3″ long, short-clawed, oblong, contracted above, the dilated apex obtuse, crenulate, often dark-striped in the middle; rostellum very acute; callosities small, glabrous.

In grassy places, southern New York to Florida and Louisiana. July–Aug.

6. Gyrostachys simplex (A. Gray) Kuntze. Little Ladies' Tresses. (Fig. 1126.)

Spiranthes simplex A. Gray, Man. Ed. 5, 506. 1867.

Gyrostachys simplex Kuntze, Rev. Gen. Pl. 664. 1891.

Stems very slender, 5′–9′ high, with small deciduous bracts above. Leaves basal, ovate or oblong, short, abruptly narrowed into a petiole, mostly disappearing at or before the flowering time; spike slender, about 1′ long and 3″ thick, glabrous, little twisted; flowers white, 1″–1½″ long; lip thin, striped, obovate-oblong, crisped at the summit, short-clawed; callosities nipple-shaped, slender; root a solitary spindle-shaped tuber.

In dry sandy soil, Massachusetts to Maryland. Aug.–Sept.

7. Gyrostachys grácilis (Bigel.) Kuntze. Slender Ladies' Tresses. (Fig. 1127.)

Neottia gracilis Bigel. Fl. Bost. Ed. 2, 322. 1824.
Spiranthes gracilis Beck, Bot. 343. 1833.
Gyrostachys gracilis Kuntze, Rev. Gen. Pl. 664. 1891.

Stem slender, 8′–2° high, from a cluster of spindle-shaped tuberous roots, glabrous, or rarely pubescent above, bearing small deciduous bracts. Leaves basal, obovate, or ovate-lanceolate, petioled, the blades ½′–2′ long, 4″–10″ wide, mostly perishing before the flowering season; spike 1′–3′ long, 4″–6″ thick, loose, usually much twisted; flowers white, fragrant, 2″–2½″ long; sepals a little longer than the lip, the lateral ones free; lip about 2″ long, oblong, dilated and crenulate or wavy-crisped at the apex, usually thick and green in the middle, white and hyaline on the margins, slightly clawed at the base; callosities small, nipple-shaped.

In dry fields and open woods, Nova Scotia to Minnesota, Florida, Louisiana and Kansas. Ascends to 2500 ft. in North Carolina. Aug.–Oct.

8. LÍSTERA R. Br. in Ait. Hort. Kew. Ed. 2, 5: 201. 1813.

Small herbs, with fibrous or sometimes rather fleshy-fibrous roots, bearing a pair of opposite green leaves near the middle, and 1 or 2 small scales at the base of the stem. Flowers in terminal racemes, spurless. Sepals and petals nearly alike, spreading or reflexed, free. Anther without a lid, erect, jointed to the column. Pollinia 2, powdery, united to a minute gland. Capsule ovoid or obovoid. [Name in honor of Martin Lister, 1638 (?)–1712, a correspondent of Ray.]

About 10 species, natives of the north temperate and arctic zones. Besides the following, another occurs in northwestern North America.

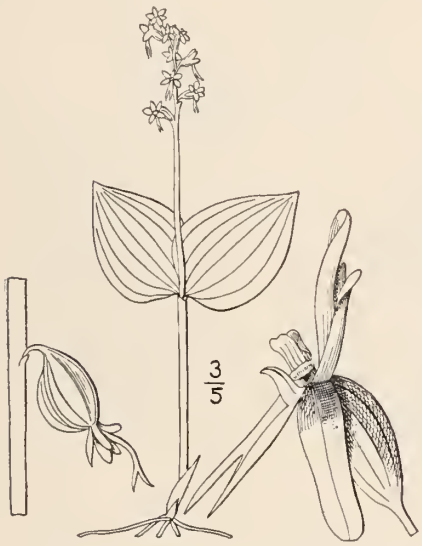
Lip broadly wedge-shaped, 2-lobed at the apex. 1. *L. convallarioides.*
Lip narrowly linear or setaceous.
  Lip 2-cleft, twice as long as the petals. 2. *L. cordata.*
  Lip 2-parted, 4–8 times as long as the petals. 3. *L. australis.*

1. Listera convallarioides (Sw.) Torr. Broad-lipped Twayblade. (Fig. 1128.)

Epipactis convallarioides Sw. Kongl. Vet. Acad. Handl, (II.) **21**: 232. 1800.
Listera convallarioides Torr. Comp. 320. 1826.

Stem 4′–10′ high, glandular-pubescent above the leaves. Leaves smooth, round-oval or ovate, obtuse or cuspidate at the apex, sometimes slightly cordate or reniform at the base, 3–9-nerved. Raceme 1½′–3′ long, loosely 3–12-flowered; flowers greenish yellow, pedicels filiform, bracted, 3″–4″ long; petals and sepals linear-lanceolate, much shorter than the lip; lip broadly wedge shaped, with 2 obtuse lobes at the dilated apex, generally with a tooth on each side at base; column elongated, but shorter than the lip, a little incurved, with 2 short projecting wings above the anther; capsule obovoid, about 3″ long.

In woods, Nova Scotia to Alaska and California, south to Vermont, along the mountains to North Carolina. Ascends to 4500 ft. in North Carolina. June–Aug.



2. Listera cordàta (L.) R. Br. Heart-leaved Twayblade. (Fig. 1129.)

Ophrys cordata L. Sp. Pl. 946. 1753.

Listera cordata R. Br. in Ait. Hort. Kew. Ed. 2, **5**: 201. 1813.

Stem very slender, glabrous or nearly so, 3′–10′ high. Leaves sessile, cordate, ovate, mucronate, ½′–1′ long; racemes rather loose, ½′–2′ long, 4–20-flowered; flowers purplish, minute; pedicels bracted, about 1″ long; sepals and petals oblong-linear, scarcely 1″ long; lip narrow, often with a subulate tooth on each side at the base, twice as long as the petals, 2-cleft, the segments setaceous and ciliolate; column very small, the clinandrium just appearing above the anther; capsule ovoid, 2″ long.

In moist woods, Nova Scotia to Alaska, New Jersey and Oregon. Also in Europe and Asia. June–Aug.

3. Listera australis Lindl. Southern Twayblade. (Fig. 1130.)

Listera australis Lindl. Gen. & Sp. Orch. 456. 1840.

Stem slender, 4′–10′ high, more or less pubescent above. Leaves ovate, acutish, mucronate, glabrous, shining, 8″–10″ long, 3–7-nerved; raceme 2′–3′ long, loosely 8–15-flowered; flowers yellowish green with purplish stripes; sepals and petals minute; lip ¼″–½′ long, 2-parted, split nearly to the base, 4–8 times as long as the petals, its segments linear-setaceous; column very small; capsule ovoid.

In bogs, New York and New Jersey to Florida and Alabama and Louisiana. A third leaf is rarely borne below the flowers.

9. PERÀMIUM Salisb. Trans. Hort. Soc. 1: 301. 1812.

[Goodyera R. Br. in Ait. Hort. Kew. Ed. 2, 5: 197. 1813.]

Herbs with bracted erect scapes, the leaves basal, tufted, often blotched with white, the roots thick fleshy fibres. Flowers in bracted spikes. Lateral sepals free, the upper one united with the petals into a galea. Lip sessile, entire, roundish ovate, concave or saccate; without callosities, its apex reflexed. Anther without a lid, erect or incumbent, attached to the column by a short stalk; pollinia one in each sac, attached to a small disk which coheres with the top of the stigma, composed of angular grains.

About 25 species, widely distributed in temperate and tropical regions.

Spike one-sided. 1. *P. repens.*
Spike not one-sided.
Flowers 2″–3″ long; galea ovate, its short tip usually not recurved. 2. *P. pubescens.*
Flowers 3″–4″ long; galea ovate-lanceolate, its long tip recurved. 3. *P. Menziesii.*

1. Peramium rèpens (L.) Salisb. Lesser Rattlesnake Plantain. (Fig. 1131.)

Satyrium repens L. Sp. Pl. 945. 1753.

Goodyera repens R. Br. in Ait. Hort. Kew. Ed. 5: 198. 1813.

Peramium repens Salisb. Trans. Hort. Soc. 1: 301. 1812.

Scape 5′–10′ high, glandular-pubescent, bearing several small scales. Leaves ovate, the blade 6″–15″ long, 4″–8″ wide, somewhat reticulated or blotched with white, tapering into a sheathing petiole spike short, 1-sided; flowers greenish white, 2″–3″ long; galea concave, ovate, with a short spreading or slightly recurved tip; lip saccate, with a narrow recurved or spreading apex; column very short; anther 2-celled; pollinia not prolonged into a caudicle.

In woods, Nova Scotia to Alaska (?), south to Florida and Minnesota and Colorado. Also in Europe and Asia. Ascends to 5000 ft. in Virginia. July–Aug.

2. Peramium pubéscens (Willd.) MacM. Downy Rattlesnake Plantain. (Fig. 1132.)

Neottia pubescens Willd. Sp. Pl. 4: 76. 1805.

Goodyera pubescens R. Br. in Ait. Hort. Kew, Ed. 2, 5: 198. 1813.

Peramium pubescens MacM. Met. Minn. 172. 1892.

Usually larger than the preceding species, scape 6′–20′ high, densely glandular-pubescent, bearing 5–10 lanceolate scales. Leaves 1′–2′ long, 8″–1′ wide, strongly white-reticulated, oval or ovate; spike not 1-sided; flowers 2″–3″ high, greenish white; lateral sepals ovate; galea ovate, its short tip usually not recurved; lip strongly saccate with a short broad obtuse recurved or spreading tip.

In dry woods, Newfoundland to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 4000 ft. in North Carolina. July–Aug.

3. Peramium Menzièsii (Lindl.) Morong. Menzies' Rattlesnake Plantain. (Fig. 1133.)

Spiranthes decipiens Hook. Fl. Bor. Am. 2: 203. 1839?

Goodyera Menziesii Lindl. Gen. & Sp. Orch. 492. 1840.

Peramium Menziesii Morong, Mem. Torr. Club, 5: 124. 1894.

Scape stout, 8′–15′ high, glandular-pubescent. Leaves ovate-lanceolate, 1½′–2½′ long, 8″–15″ wide, the blade acute at both ends, often without white blotches or reticulations; spike not 1-sided; flowers 3″–4″ long; galea concave, ovate-lanceolate, the tip long, usually recurved, lip swollen at the base, with a long narrow recurved or spreading apex; anther ovate, pointed, on the base of the column, which is prolonged above the stigma into a gland-bearing awl-shaped beak.

In woods, Quebec to British Columbia, New Hampshire, New York, Minnesota, Arizona and California. Aug.

10. ACHROÁNTHES Raf. Med. Rep. (II.) 5: 352. 1808.

[Microstylis Nutt. Gen. 2: 196. 1818.]

Low herbs, from a solid bulb, our species 1-leaved, and with 1–several scales at the base of the stem. Flowers small, white or green, in a terminal raceme. Sepals spreading, separate, the lateral ones equal at the base. Petals filiform or linear, spreading. Lip cordate or eared at the base, embracing the column. Anther erect between the auricles, 2-celled; pollinia 4, smooth and waxy, 2 in each sac, the pairs cohering at the summit, without caudicles or glands. Capsule oval, sometimes nearly globose, beakless. [Greek, in allusion to the green flowers?]

About 40 species, widely distributed. Besides the following, about 4 others occur in the southern and western parts of North America.

Leaf sheathing the base of the stem. 1. *A. monophylla.*
Leaf clasping the stem near the middle. 2. *A. unifolia.*

1. Achroanthes monophýlla (L.) Greene. White Adder's-mouth. (Fig. 1134.)

Ophrys monophyllos L. Sp. Pl. 947. 1753.

Microstylis monophylla Lindl. Bot. Reg. *pl. 1290.* 1829.

Achroanthes monophylla Greene, Pittonia, 2: 183. 1891.

Stem slender, 4′–6′ high, smooth, glabrous, striate. Leaf sheathing the stem at its base, the blade 1′–2′ long, ½′–1½′ wide; raceme 1′–3′ long, narrow, 3″–5″ thick; flowers whitish, about 1″ long; pedicels nearly erect, bracted, 1″–2″ long; sepals acute; lip triangular or ovate, acuminate, the lateral lobes obtuse; capsule oval, about 3″ long.

In woods, Quebec to Minnesota, Pennsylvania and Nebraska. July.

2. **Achroanthes unifòlia** (Michx.) Raf. Green Adder's-mouth. (Fig. 1135.)

Malaxis unifolia Michx. Fl. Bor. Am. 2: 157. 1803.

Achroanthes unifolia Raf. Med. Rep. (II.) 5: 352. 1808.

Microstylis ophioglossoides Nutt. Gen. 2: 196. 1818.

Stem glabrous, striate, 4′–10′ high. Leaf clasping the stem near the middle, oval or nearly orbicular, 1′–2½′ long, 10″–1½′ wide; raceme 1′–3′ long, sometimes 1′ thick; flowers greenish, about 1″ long, the pedicels very slender, spreading, 3″–5″ long; sepals oblong; lip broad, 3-toothed at the apex; capsule oval or subglobose.

In woods and thickets, Newfoundland to Ontario and Minnesota, south to Florida, Alabama and Missouri. Ascends to 4000 ft. in North Carolina. July.

11. LEPTÓRCHIS Thouars, Nouv. Bull. Soc. Philom. 314. 1808.

[Liparis L. C. Richard, Mem. Mus. Paris, 4: 43. 1818.]

Low herbs, with solid bulbs, the base of the stem sheathed by several scales and 2 broad shining leaves. Flowers in terminal racemes. Sepals and petals nearly equal, linear, spreading, petals usually very narrow. Column elongated, incurved, thickened and margined above. Pollinia 2 in each sac of the anther smooth and waxy, the pairs slightly united, without stalk, threads or glands. Lip nearly flat, often bearing 2 tubercles above the base. [Greek, signifying a slender orchid.]

About 100 species, widely distributed in temperate and tropical regions; only the following known to occur in North America.

Raceme many-flowered; lip as long as the petals. 1. *L. liliifolia.*
Raceme few-flowered; lip shorter than the petals. 2. *L. Loeselii.*

1. **Leptorchis liliifòlia** (L.) Kuntze. Large Twayblade. (Fig. 1136.)

Ophrys liliifolia L. Sp. Pl. 946. 1753.

Liparis liliifolia L. C. Rich. Lindl. Bot. Reg. *pl. 882.* 1825.

Leptorchis liliifolia Kuntze, Rev. Gen. Pl. 671. 1891.

Scape 4′–10′ high, 5–10-striate. Leaves ovate or oval, 2′–5′ long, 1′–2½′ wide, obtuse, keeled below, the sheaths large and loose. Raceme sometimes 6′ long; flowers numerous, showy; sepals and petals somewhat reflexed; petals very narrow or thread-like; lip erect, large, 5″–6″ long, about as long as the petals, wedge-obovate; column 1½″ long, incurved, dilated at the summit; pedicels slender, ascending or spreading, 4″–8″ long; capsule somewhat club-shaped, about 6″ long, the pedicel thickened in fruit.

In moist woods and thickets, Maine to Minnesota, Georgia and Missouri. Ascends to 3000 ft. in Virginia. May–July.

2. Leptorchis Loesèlii (L.) MacM. Fen Orchis. Loesel's Twayblade. (Fig. 1137.)

Ophrys Loeselii L. Sp. Pl. 947. 1753.
Liparis Loeselii L. C. Rich.; Lindl. Bot. Reg. *pl. 882.* 1825.
Leptorchis Loeselii MacM. Met. Minn. 173. 1892.

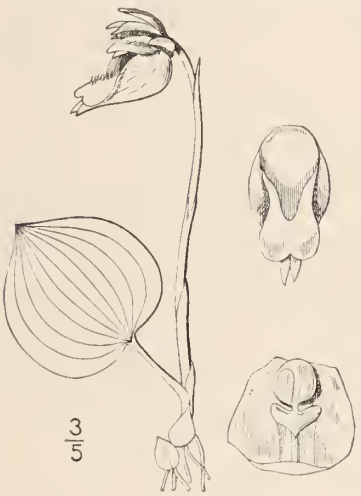
Scape 2′–8′ high, strongly 5–7-ribbed. Leaves elliptic or elliptic-lanceolate, 2′–6′ long, ½′–2′ wide, obtuse; raceme few-flowered; flowers greenish, smaller than those of the preceding species, 2″–3″ long; sepals narrowly lanceolate, spreading; petals linear, somewhat reflexed; lip obovate, pointed, rather shorter than the petals and sepals, its tip incurved; column half as long as the lip or less; capsule about 5″ long, wing-angled, on a thickened pedicel.

In wet thickets and on springy banks, Nova Scotia to the Northwest Territory, south to Maryland and Missouri. Also in Europe. May–July.

12. CALÝPSO Salisb. Par. Lond. *pl. 89.* 1807.

Bog herb, with a solid bulb and coralloid roots, the low 1-flowered scape sheathed by 2 or 3 loose scales and a solitary petioled leaf at the base. Flower large, showy terminal, bracted. Sepals and petals similar, nearly equal. Lip large, saccate or swollen, 2-parted below. Column dilated, petal-like, bearing the lid-like anther just below the summit. Pollinia 2, waxy, each 2-parted, without caudicles, sessile on a thick gland, the stigma at the base. [Dedicated to the goddess Calypso.]

A monotypic species of the cooler portions of the north temperate zone.



1. Calypso bulbòsa (L.) Oakes. Calypso. (Fig. 1138.)

Cypripedium bulbosum L. Sp. Pl. 951. 1753.
Calypso borealis Salisb. Par. Lond. *pl. 89.* 1807.
Calypso bulbosa Oakes, Cat. Vermont Pl. 28. 1842.

Bulb 5″ in diameter or less. Scape 3′–6′ high; leaf round-ovate, 1′–1½′ long, nearly as wide, obtusely pointed at the apex, rounded or subcordate at the base, the petiole 1′–2′ long; flowers variegated, purple, pink and yellow, the peduncle jointed; petals and sepals linear, erect or spreading, 5″–7″ long, with 3 longitudinal purple lines; lip large, saccate, 2-divided below, spreading or drooping, with a patch of yellow woolly hairs near the point of division; column erect, broadly ovate, shorter than the petals; capsule about ½′ long, many-nerved.

Labrador to Alaska, south to Maine, Michigan, California, and in the Rocky Mountains to Arizona. Also in Europe. Flower somewhat resembling that of a small *Cypripedium*. May–June.

13. CORALLORHÌZA R. Br. in Ait. Hort. Kew. Ed. 2, 5: 209. 1813.

Scapose herbs, saprophytes or root-parasites, with large masses of coralloid branching roots, the leaves all reduced to sheathing scales. Flowers in terminal racemes. Sepals nearly equal, the lateral ones united at the base with the foot of the column, forming a short spur or gibbous protuberance, the other one free, the spur adnate to the summit of the ovary. Petals about as long as the sepals, 1–3-nerved. Lip 1–3-ridged. Column nearly free, slightly incurved, somewhat 2-winged. Anther terminal, operculate. Pollinia 4, in 2 pairs, oblique, free, soft-waxy. [Greek, from the coral-like roots.]

About 15 species, widely distributed in the north temperate zone. Besides the following, some 4 others occur in the southern and western parts of North America.

Spur small or sac-like, adnate to the top of the ovary.
- Lip not deeply 3-lobed.
  - Lip 2-toothed or 2-lobed above the base. — 1. *C. Corallorhiza.*
  - Lip entire, or merely denticulate.
    - Flowers about 3″–4″ long; lip not notched; column narrowly winged. — 2. *C. odontorhiza.*
    - Flowers 7″ long; lip notched; column manifestly winged. — 3. *C. Wisteriana.*
- Lip deeply 3-lobed; flowers 6″–9″ long. — 4. *C. multiflora.*

No spur or sac. — 5. *C. striata.*

1. Corallorhiza Corallorhìza (L.) Karst. Early Coral-root. (Fig. 1139.)

Ophrys Corallorhiza L. Sp. Pl. 945. 1753.

Corallorhiza innata R. Br. in Ait. Hort. Kew. Ed. 2, 5: 209. 1813.

Corallorhiza Corallorhiza Karst. Deutsch. Fl. 448. 1880–83.

Scape glabrous, 4′–12′ high, clothed with 2–5 closely sheathing scales. Raceme 1′–3′ long, 3–12-flowered; flowers dull purple, about ½′ long, on very short minutely bracted pedicels; sepals and petals narrow, about 3″ long; lip shorter than the petals, oblong, whitish, 2-toothed or 2-lobed above the base; spur, a sac or small protuberance adnate to the summit of the ovary; capsule 4″–6″ long, oblong or somewhat obovoid.

In woods, Nova Scotia to Alaska, south to New Jersey, in the mountains to Georgia, and to Michigan and Washington. Ascends to 3000 ft. in Vermont. Also in Europe. May–June.

2. Corallorhiza odontorhìza (Willd.) Nutt. Small-flowered Coral-root. (Fig. 1140.)

Cymbidium odontorhizon Willd. Sp. Pl. 4: 110. 1805.

Corallorhiza odontorhiza Hutt. Gen. 2: 197. 1818.

Scape slender, purplish, 6′–15′ high. Raceme 2′–4′ long, 6–20-flowered; flowers 3″–4″ long, purplish, sepals and petals lanceolate, 2″ long or less, marked with purple lines; lip as long as the petals, broadly oval or obovate, entire or denticulate, narrowed at the base, not notched, whitish; spur, a small sac adnate to the top of the ovary; wings of the columu very narrow.

In woods, Massachusetts to Michigan, Florida and Missouri. Ascends to 3000 ft. in North Carolina. July–Sept.

3. Corallorhiza Wisteriàna Conrad. Wister's Coral-root. (Fig. 1141.)

Corallorhiza Wisteriana Conrad, Journ. Acad. Phila. 6: 145. 1829.

Stem slender, but usually stouter than that of the preceding species, 8′–16′ high, bearing several sheathing scales. Raceme 2′–5′ long, loose, 6–15-flowered; flowers about 7″ long, slender-pedicelled, ascending or erect; lip broadly oval or obovate, 4″–5″ long, 4″–5″ wide; abruptly clawed, white with crimson spots, crenulate, notched at the apex; lamellae, 2 short prominent ridges; spur, a somewhat conspicuous protuberence adnate to the top of the ovary; column strongly 2-winged toward the base; capsule elliptic-oblong or oblong-obovoid, about 5″ long, drooping when ripe.

In woods, Massachusetts to Ohio, Florida and Texas. Feb.–May.

4. Corallorhiza multiflòra Nutt. Large Coral-root. (Fig. 1142.)

Corallorhiza multiflora Nutt. Journ. Acad. Phila. 3: 138. *pl.* 7. 1823.

Scape 8′–20′ high, purplish, clothed with several appressed scales. Raceme 2′–8′ long, 10–30-flowered; flowers 6″–9″ high, brownish purple, short-pedicelled; sepals and petals somewhat connivent at the base, linear-lanceolate, about 3″ long; lip white, spotted and lined with purple, oval or ovate in outline, deeply 3-lobed, crenulate, the middle lobe broader than the lateral ones, its apex curved; spur manifest, yellowish; capsule ovoid or oblong, 5″–8″ long, drooping.

In woods, Nova Scotia to British Columbia, south to Florida, Missouri and California. A form with yellow scapes and flowers occurs in Nebraska (according to Williams). July–Sept.

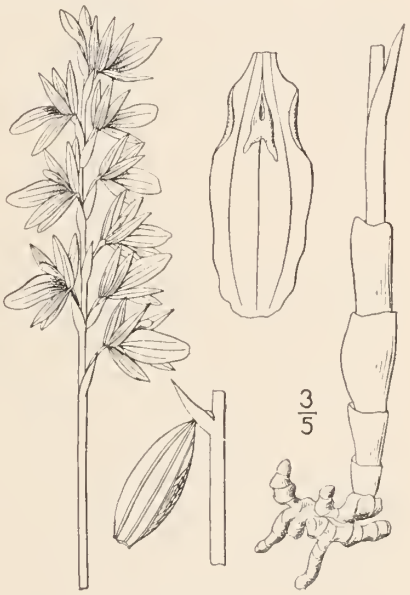
5. Corallorhiza striàta Lindl. Striped Coral-root. (Fig. 1143.)

Corallorhiza striata Lindl. Gen. & Sp. Orch. 534. 1840.

Corallorhiza Macraei A. Gray, Man. Ed. 2, 453. 1856.

Scape stout, purplish, 8′–20′ high. Raceme 2′–6′ long, 10–25-flowered. Flowers dark purple; sepals and petals narrowly elliptic, striped with deeper purple lines, 6″–7″ long, spreading; lip oval or obovate, entire or a little undulate, somewhat narrowed at the base, about as long as the petals; spur none, but the perianth has a gibbous saccate base; capsule ellipsoid, reflexed, 8″–10″ long.

In woods, Ontario and northern New York to Michigan, Oregon and California. July.



14. TIPULÀRIA Nutt. Gen. 2: 195. 1818.

Slender scapose herbs, with solid bulbs, several generations connected by offsets, the flowers in a long loose terminal raceme. Leaf solitary, basal, unfolding long after the flowering season (in autumn), usually after the scape has perished. Scape with several thin sheathing scales at the base. Flowers green, nodding, bractless. Sepals and petals similar, spreading. Lip 3-lobed, produced backwardly into a very long spur. Column erect, wingless or very narrowly winged. Anther terminal, operculate, 2-celled. Pollinia 4, ovoid, waxy, 2 in each anther-sac, separate, affixed to a short stipe, which is glandular at the base. [Latin, similar to *Tipula*, a genus of insects, in allusion to the form of the flower.]

Two known species, the following of eastern North America, the other Himalayan.

1. Tipularia unifòlia (Muhl.) B.S.P. Crane-fly Orchis. (Fig. 1144.)

Limodorum unifolium Muhl. Cat. 81. 1813.
Tipularia discolor Nutt. Gen. 2: 195. 1818.
Tipularia unifolia B.S.P. Prel. Cat. N. Y. 51. 1888.

Scape glabrous, 15′–20′ high, from a hard, often irregular solid bulb or corm. Leaf arising in autumn from a fresh lateral corm, ovate, 2′–3′ long, dark green, frequently surviving through the winter, 1′–2′ wide. Raceme 5′–10′ long, very loose; flowers green, tinged with purple; pedicels filiform, bractless; 4″–6″ long; sepals and petals 3″–4″ long, narrow; lip shorter than the petals or equalling them, 3-lobed, the middle lobe narrow, prolonged, dilated at the apex, the lateral lobes short, triangular; spur very slender, straight or curved, often twice as long as the flower; column narrow, erect, shorter than the petals, the beak minutely pubescent; capsule ellipsoid, 6-ribbed, about 6″ long.

In woods, Vermont to Michigan, south to Florida and Louisiana. Local and rare. July–Aug.

15. LIMODÒRUM L. Sp. Pl. 950. 1753.

[Calopogon R. Br. in Ait. Hort. Kew. Ed. 2, 5: 204. 1813.]

Scapose herbs, with round solid bulbs which arise from the bulb of the previous year, a leaf appearing the first season, succeeded in the following year by the scape. Flowers several in a loose terminal spike or raceme. Sepals and petals nearly alike, separate, spreading. Column elongated, 2-winged above. Anther terminal, operculate, sessile; pollinia solitary, 1 in each sac, loosely granular. Lip spreading, raised on a narrow stalk, dilated at the apex, bearded on the upper side with long club-shaped hairs. [Greek, a meadow-gift.]

1. Limodorum tuberòsum L. Grass-pink. Calopogon. (Fig. 1145.)

Limodorum tuberosum L. Sp. Pl. 950. 1753.
Cymbidium pulchellum Willd. Sp. Pl. 4: 105. 1805.
Calopogon pulchellus R. Br. in Ait. Hort. Kew. Ed. 2, 5: 204. 1813.

Scape slender, naked, 1°–1½° high. Leaf linear-lanceolate, 8′–12′ long, 3″–10″ wide, sheathing, with several scales below it; spike 4′–15′ long, 3–15-flowered; flowers about 1′ long, purplish pink, subtended by small acute bracts; sepals obliquely ovate-lanceolate, acute, about 10″ long; petals similar; column incurved; anther-sacs parallel, attached by a slender thread to the back of the column; lip as long as the column, broadly triangular at the apex, crested along the face with yellow, orange and rose-colored hairs; capsule oblong, nearly erect.

In bogs and meadows, Newfoundland to Ontario and Minnesota, south to Florida and Missouri. June–July.

16. HEXALÉCTRIS Raf. Neog. 4. 1825.

Scapose herbs, from thick scaly rootstocks and fleshy coralloid roots, the leaves reduced to purplish scales, sheathing the scape. Flowers bracted in a loose terminal raceme. Perianth not gibbous or spurred at the base, the petals and sepals similar, nerved, spreading. Lip obovate, with several crested ridges down the middle, somewhat 3-lobed, the middle lobe a little concave. Column free, thick, slightly incurved. Pollinia 8, united in a cluster. Capsule ellipsoid, the fruiting pedicels thick. [Greek, signifying six crests.]

A monotypic genus of the southeastern United States and Mexico.

1. Hexalectris aphýllus (Nutt.) Raf. Crested Coral-root. (Fig. 1146.)

Bletia aphylla Nutt. Gen. 2: 194. 1818.

Hexalectris squamosus Raf. Fl. Tell. 4: 48. 1836.

Hexalectris aphyllus Raf.; A. Gray, Man. Ed. 6, 501. 1890.

Scape stout, 8′–20′ high, its upper scales lanceolate, the lower sheathing and truncate or acute. Raceme 4′–7′ long, 8–12-flowered; flowers large, brownish purple, 1′ high or more; pedicels short, stout; sepals and petals narrowly elliptic, obtuse or acutish, spreading, striped with purple veins, 6″–9″ long, longer than the broad lip; middle lobe of the lip rounded or crenulate, the lateral ones shorter, rounded; column slightly spreading at the summit, shorter than the lip; capsule ellipsoid, nearly 1′ long, the fruiting pedicels 4″–5″ long.

In rich woods, North Carolina to Kentucky and Missouri, south to Florida and northern Mexico. Aug.

17. APLÉCTRUM Nutt. Gen. 2: 197. 1818.

Scapose herbs, from a corm, produced from the one of the previous season by an offset, the scape clothed with several sheathing scales. Leaf solitary, basal; developed in autumn or late summer, broad, petioled. Flowers in terminal racemes, the pedicels subtended by small bracts. Petals and sepals similar, narrow. Lip clawed, somewhat 3-ridged, spur none. Column free, the anther borne a little below its summit. Pollinia 4, lens-shaped, oblique. [Greek, meaning without a spur.)

A monotypic North American genus.

1. Aplectrum spicàtum (Walt.) B.S.P. Adam-and-Eve. Putty-root. (Fig. 1147.)

Arethusa spicata Walt. Fl. Car. 222. 1788.

Cymbidium hyemale Willd. Sp. Pl. 4: 107. 1805.

Aplectrum hyemale Nutt. Gen. 2: 198. 1818.

Aplectrum spicatum B.S.P. Prel. Cat. N. Y. 51. 1888.

Scape glabrous, 1°–2° high, bearing about 3 scales. Leaf arising from the corm, at the side of the scape, elliptic or ovate, 4′–6′ long, ½′–3′ wide, usually lasting over winter; raceme 2′–4′ long, loosely several-flowered; flowers dull yellowish brown mixed with purple, about 1′ long, short-pedicelled; sepals and petals linear-lanceolate, about ½′ long; lip shorter than the petals, obtuse, somewhat 3-lobed and undulate; column slightly curved, shorter than the lip; capsule oblong-ovoid, angled, about 10″ long.

In woods and swamps, Ontario to the Northwest Territory and Oregon, south to Georgia, Missouri and California. Several old corms usually remain attached to the latest one. May–June.

Sub-class 2. *DICOTYLÉDONES.*

Embryo of the seed with two cotyledons (in a few genera one only, as in *Cyclamen*, *Pinguicula* and some species of *Capnoides*), the first leaves of the germinating plantlet opposite. Stem exogenous, of pith, wood and bark (endogenous in structure in Nymphaeaceae), the wood in one or more layers surrounding the pith, traversed by medullary rays and covered by the bark. Leaves usually pinnately or palmately veined, the veinlets forming a network. Parts of the flower rarely in 3's or 6's.

Dicotyledonous plants are first definitely known in Cretaceous time. They constitute between two-thirds and three-fourths of the living angiospermous flora.

Series 1. *Choripétalae.*

Petals separate and distinct from each other, or wanting.

The series is also known as Archichlamideae, and comprises most of the families formerly grouped under Apetalae (without petals) and Polypetalae (with separate petals). Exceptions to the typical feature of separate petals are found in the Leguminosae, in which the two lower petals are more or less united; in the Fumariaceae, where the two inner petals or all four of them are sometimes coherent; the Polygalaceae, in which the three petals are united with each other, and with the stamens; *Oxalis* in Geraniaceae; and Ilicaceae, whose five petals are sometimes joined at the base.

Family 1. SAURURÀCEAE Lindl. Nat. Syst. Ed. 2, 184. 1836.

Lizard's tail Family.

Perennial herbs with broad entire alternate petioled leaves, and small perfect incomplete bracteolate flowers, in peduncled spikes. Perianth none. Stamens 6–8, or sometimes fewer, hypogynous; anthers 2-celled, the sacs longitudinally dehiscent. Ovary 3–4-carpelled, the carpels distinct or united, 1–2-ovuled; ovules orthotropous. Fruit capsular or berry-like, composed of 3–4 mostly indehiscent carpels. Seeds globose or ovoid, the testa membranaceous. Endosperm copious, mealy. Embryo minute, cordate, borne in a small sac near the end of the endosperm.

Three genera and 4 species, natives of North America and Asia. The family differs from the Piperaceae in having more than one carpel to the ovary. It is represented in North America by the following and by *Anemopsis*, occurring in California and Arizona.

1. SAURÙRUS L. Sp. Pl. 341. 1753.

Marsh herbs, with slender rootstocks, jointed stems and cordate leaves, their petioles sheathing the stem at the nodes, and small white flowers, in 1 or 2 dense elongated spikes opposite the leaves. Bractlets adnate to the flowers or to their minute pedicels. Stamens 6–8. Filaments filiform, distinct. Carpels united at the base. Styles as many as the carpels, recurved, stigmatic along the inner side. Fruit rugose, depressed-globose, separating into 3 or 4 one-seeded carpels. [Name Greek, meaning the tail of a lizard, in allusion to the long slender spike.]

Two species, the following of eastern North America, the other of eastern Asia.

1. Saururus cérnuus L. Lizard's-tail. (Fig. 1148.)

Saururus cernuus L. Sp. Pl. 341. 1753.

Somewhat pubescent when young, becoming glabrous, stem rather slender, erect, sparingly branched, 2°–5° high. Leaves ovate, thin, palmately 5–9-ribbed and with a pair of strong ribs above, which run nearly to the apex, dark green, entire, deeply cordate at the base, acuminate, 3′–6′ long, 2′–3½′ wide; petioles stout, shorter than the blades, striate; spikes few, very dense, longer than their peduncles, 4′–6′ long, the apex drooping in flower; flowers fragrant; stamens white, spreading, about 2″ long; fruit slightly fleshy, 1½″ in diameter, strongly wrinkled when dry.

In swamps and shallow water, Connecticut to Florida, west to southern Ontario, Minnesota and Texas. June–Aug.

Family 2. JUGLANDÀCEAE Lindl. Nat. Syst. Ed. 2, 180. 1836.

WALNUT FAMILY.

Trees with alternate pinnately compound leaves, and monoecious bracteolate flowers, the staminate in long drooping aments; the pistillate solitary or several together. Staminate flowers consisting of 3–numerous stamens with or without an irregularly lobed perianth adnate to the bractlet, very rarely with a rudimentary ovary. Anthers erect, 2-celled, the sacs longitudinally dehiscent; filaments short. Pistillate flowers bracted and usually 2-bracteolate, with a 3–5-lobed (normally 4-lobed) calyx or with both calyx and petals, and an inferior 1-celled or incompletely 2–4-celled ovary. Ovule solitary, erect, orthotropous; styles 2, stigmatic on the inner surface. Fruit in our genera a drupe with indehiscent or dehiscent, fibrous or woody exocarp (husk; ripened calyx; also regarded as an involucre), enclosing the bony endocarp or nut which is incompletely 2–4-celled. Seed large, 2–4-lobed. Endosperm none. Cotyledons corrugated, very oily. Radicle minute, superior.

Six genera and about 35 species, mostly of the warmer parts of the north temperate zone, extending in America south along the Andes to Bolivia. The young leaves in the bud are stipulate in at least two species of *Hicoria*.

Husk indehiscent; nut rugose. 1. *Juglans.*
Husk at length splitting into segments; nut smooth or angled. 2. *Hicoria.*

1. JÙGLANS L. Sp. Pl. 997. 1753.

Trees, with spreading branches, superposed buds, fragrant bark, and odd-pinnate leaves, with nearly or quite sessile leaflets, the terminal one sometimes early perishing. Staminate flowers in drooping cylindric aments, borne on the twigs of the previous year; perianth 3-6-lobed; stamens 8–40 in 2 or more series. Pistillate flowers solitary or several together on a terminal peduncle at the end of shoots of the season, the calyx 4-lobed, with 4 small petals adnate to the ovary at the sinuses; styles fimbriate, very short. Drupe large, globose or ovoid, the exocarp somewhat fleshy, fibrous, indehiscent, the endocarp bony, rugose or sculptured, 2–4-celled at the base, indehiscent, or in decay separating into 2 valves. [Name a contraction of the Latin *Jovis glans*, the nut of Jupiter.]

About 8 species, natives of the north temperate zone, one in the West Indies, 1 or 2 in the Andes of South America. Besides the following 1 or 2 others occur in the southwestern United States.

Fruit globose, obtuse, not viscid; petioles puberulent. 1. *J. nigra.*
Fruit oblong, pointed, viscid; petioles pubescent. 2. *J. cinerea.*

1. Juglans nìgra L. Black Walnut. (Fig. 1149.)

Juglans nigra L. Sp. Pl. 997. 1753.

A large forest tree with rough brown bark, maximum height about 150°, trunk diameter 8°, the twigs of the season and petioles puberulent, the older twigs glabrous or very nearly so. Leaflets 13–23, ovate-lanceolate, more or less inequilateral, acuminate at the apex, rounded or subcordate at the base, serrate with low teeth, glabrous or very nearly so above, pubescent beneath, 3′–5′ long, 1′–2′ wide; staminate aments solitary in the axils of leaf-scars of the preceding season, 3′–5′ long; drupes usually solitary or 2 together, globose or a little longer than thick, 1½′–3′ in diameter, glabrous but papillose, not viscid; nut corrugated, slightly compressed, 4 celled at the base.

In rich woods, Massachusetts to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood strong, hard, rich brown; weight per cubic foot 38 lbs. April–May. Fruit ripe Oct.–Nov.

2. Juglans cinèrea L. Butternut. White Walnut. Oil-nut. (Fig. 1150.)

Juglans cinerea L. Sp. Pl. Ed. 2, 1415. 1763.

A forest tree, resembling the Black Walnut, but smaller, rarely over 100° high and 3° in trunk diameter, the bark gray, smoother, the twigs, petioles and leaflets viscid-pubescent, at least when young. Leaflets 11–19, oblong-lanceolate, acuminate at the apex, scarcely inequilateral, obtuse, rounded or truncate at the base, serrate with low teeth; drupes racemed, oblong, densely viscid-pubescent, 2′–3′ long and about one-half as thick, pointed; nut 4-ribbed, deeply sculptured, and with sharp longitudinal ridges, firmly adherent to the husk, 2-celled at the base.

In rich or rocky woods, New Brunswick and Ontario to North Dakota, south to Delaware, in the Alleghenies to Georgia, to Mississippi and Arkansas. Ascends to 2500 ft. in Virginia. Wood soft, rather weak, light brown; weight per cubic foot 25 lbs. April–May. Fruit ripe Oct.–Nov.

2. HICÒRIA Raf. Med. Rep. (II.) 5: 352. 1808.

[Carya Nutt. Gen. 2: 221. 1818.]

Trees, with close or shaggy bark, odd-pinnate leaves and serrate or serrulate leaflets. Staminate flowers in slender drooping aments, borne in 3's on a common peduncle at the base of the shoots of the season, or clustered and sessile or nearly so in the axils of leaf-scars at the summit of twigs of the preceding year; calyx adnate to the bract, 2–3-lobed or 2–3-cleft; stamens 3–10; filaments short. Pistillate flowers 2–6, together on a terminal peduncle; bract fugacious or none; calyx 4-toothed; petals none; styles 2 or 4, papillose or fimbriate, short. Fruit subglobose, oblong or obovoid, the husk separating more or less completely into 4 valves; nut bony, smooth or angled, incompletely 2–4-celled; seed sweet and delicious or very bitter and astringent. [From the aboriginal name Hicori.]

About 10 species, natives of eastern North America, one in Mexico.

Bud-scales valvate; lateral leaflets lanceolate or oblong-lanceolate, falcate.
- Nut not compressed or angled; seed sweet. — 1. *H. Pecan.*
- Nut somewhat compressed or angled; seed intensely bitter.
  - Leaflets 7–9; nut smooth. — 2. *H. minima.*
  - Leaflets 9–13; nut angled. — 3. *H. aquatica.*

Bud-scales imbricate; lateral leaflets not falcate.
- Husk of the fruit freely splitting to the base; middle lobe of the staminate calyx at least twice as long as the lateral ones.
  - Bark shaggy, separating in long plates; foliage glabrous or puberulent.
    - Leaflets 5 (rarely 7); nut rounded at the base, 6′′–10′′ long. — 4. *H. ovata.*
    - Leaflets 7–9; nut usually pointed at both ends, 1′–1½′ long. — 5. *H. laciniosa.*
  - Bark close, rough; foliage very pubescent and fragrant. — 6. *H. alba.*
- Husk of fruit thin, not freely splitting to the base; lobes of the staminate calyx nearly equal.
  - Lateral leaflets ovate-lanceolate, not falcate; fruit rounded or scarcely ridged.
    - Fruit nearly globular; nut thin-shelled; bark shaggy. — 7. *H. microcarpa.*
    - Fruit obovoid; nut thick-shelled; bark close. — 8. *H. glabra.*

1. Hicoria Pecán (Marsh.) Britton. Pecan. (Fig. 1151.)

Juglans Pecan Marsh. Arb. Am. 69. 1785.
Carya olivaeformis Nutt. Gen. 2: 221. 1818.
Hicoria Pecan Britton, Bull. Torr. Club, 15: 282. 1888.

A large slender tree, with somewhat roughened bark, maximum height of 170° and trunk diameter 6°. Young twigs and leaves pubescent; mature foliage nearly glabrous; bud-scales few, small, valvate; leaflets 11–15, falcate, oblong-lanceolate, short-stalked, inequilateral, acuminate, 4′–7′ long; staminate aments sessile or nearly so in the axils of leaf-scars near the end of twigs of the preceding season or sometimes on the young shoots, 5′–6′ long; middle lobe of the staminate calyx linear, much longer than the broadly oblong lateral ones; fruit oblong-cylindric, 1½′–2½′ long; husk thin, 4-valved; nut smooth, oblong, thin-shelled, pointed, 2-celled at base, dissepiments thin, very astringent; seed delicious.

In moist soil, especially along streams, Indiana to Iowa and Missouri, south to Kentucky and Texas. Wood hard, brittle, light brown; weight 45 lbs. April–May. Fruit ripe Sept.–Oct.

2. Hicoria mínima (Marsh.) Britton. Bitter-nut. Swamp Hickory. (Fig. 1152.)

Juglans alba minima Marsh. Arb. Am. 68. 1785.
Juglans sulcata Willd. Berl. Baumz. 154. 1796.
Carya amara Nutt. Gen. 2: 222. 1818.
Hicoria minima Britton, Bull. Torr. Club, 15: 284. 1888.

A slender tree, sometimes 100° high, with trunk 3° in diameter, the bark close and rough. Bud-scales 6–8, small, valvate, caducous, young foliage puberulent, becoming nearly glabrous; leaflets 7–9, sessile, long-acuminate, lanceolate or oblong-lanceolate, 3′–6′ long, ½′–1½′ wide, the lateral ones falcate; staminate aments slightly pubescent, peduncled in 3's at the bases of shoots of the season or sometimes on twigs of the previous year; lobes of the staminate calyx about equal, the middle one narrower; fruit subglobose, narrowly 6 ridged 1′–1½′ in diameter; husk thin, tardily and irregularly 4-valved; nut little compressed, not angled, short-pointed, 9″–12″ long, thin-shelled; seed very bitter.

In moist woods and swamps, Quebec to southern Ontario and Minnesota, Florida and Texas. Ascends to 3500 ft. in Virginia. Wood hard and strong, dark brown; weight per cubic foot 47 lbs. May–June. Fruit ripe Sept.–Oct.

3. Hicoria aquática (Michx. f.) Britton. Water Hickory. (Fig. 1153.)

Juglans aquatica Michx. f. Hist. Arb. Am. 1: 182. *pl.* 5. 1810.
Carya aquatica Nutt. Gen. 2: 222. 1818.
Hicoria aquatica Britton, Bull. Torr. Club, 15: 284. 1888.

A swamp tree, attaining a maximum height of about 100° and a trunk diameter of 3°, the bark close, the young foliage pubescent, becoming nearly glabrous when mature. Leaflets 9–13, lanceolate, or the terminal one oblong, long-acuminate at the apex, narrowed at the base, 3′–5′ long, ½′–1′ wide, the lateral strongly falcate; staminate aments and calyx as in the preceding species; fruit oblong, ridged, 1′–1½′ long, pointed; husk thin, tardily splitting; nut oblong, thin-shelled, angular; seed bitter.

In wet woods and swamps, Virginia to Florida, west to Illinois, Arkansas and Texas. Wood soft, strong, dense, dark brown; weight per cubic foot 46 lbs. March–April. Fruit ripe Sept.–Oct.

4. Hicoria ovàta (Mill.) Britton. Shag-bark. Shell-bark Hickory. (Fig. 1154.)

Juglans ovata Mill. Gard. Dict. Ed. 8, No. 6. 1768.
Carya alba Nutt. Gen. 2: 221. 1818. Not *Juglans alba* L.
Hicoria ovata Britton, Bull. Torr. Club, 15: 283. 1888.

A large tree, sometimes 120° high, with a trunk diameter of 4°; bark shaggy in narrow plates; young twigs and leaves puberulent, becoming glabrous. Leaflets 5, or sometimes 7, oblong, oblong-lanceolate or the upper obovate, acuminate at the apex, narrowed to the sessile base, 4′–6′ long, those of young plants much larger, bud-scales 8–10, imbricated, the inner becoming very large and tardily deciduous; staminate aments in 3's, on slender peduncles at the bases of shoots of the season; middle lobe of the staminate calyx linear, longer than the lateral ones; fruit subglobose, 1¼′–2½′ long; husk thick, soon splitting into 4 valves; nut white, somewhat compressed, 4-celled at the base, 2-celled (rarely 3-celled) above, pointed, slightly angled, thin-shelled; seed sweet.

In rich soil, Quebec to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood strong and tough, light brown; weight per cubic foot 52 lbs. Sometimes called White Walnut. May. Fruit ripe Sept.–Nov.

5. Hicoria laciniòsa (Michx. f.) Sarg. Big Shag-bark. King-nut. (Fig. 1155.)

Carya sulcata Nutt. Gen. 2: 221. 1818. Not *Juglans sulcata* Willd. 1796.
Juglans laciniosa Michx. f. Hist. Arb. Am. 1: 199. *pl. 8.* 1810.
Hicoria sulcata Britton, Bull. Torr. Club, 15: 283. 1888.
Hicoria laciniosa Sarg. Mem. Torr. Club, 5: 354. 1894.

A large tree, reaching about the size of the preceding species, the bark separating in long narrow plates, the young foliage densely puberulent, the mature leaves somewhat so beneath. Leaflets 7–9, (rarely 5) acute or acuminate, oblong-lanceolate or the upper obovate, sometimes 8′ long by 5′ wide; staminate aments peduncled in 3's at the base of shoots of the season; middle lobe of the staminate calyx linear, twice as long as the lateral ones; fruit oblong, 2′–3′ long; husk thick, soon splitting to the base; nut oblong, somewhat compressed, thick-shelled, pointed at both ends, yellowish-white; seed sweet.

In rich soil, New York and Pennsylvania to Indiana, Iowa, Tennessee, Kansas and the Indian Territory. Wood strong and tough, darker than the preceding; weight 50 lbs. per cubic foot. May. Fruit ripe Sept.–Oct.

6. Hicoria álba (L.) Britton. White-heart Hickory. Mocker-nut. (Fig. 1156.)

Juglans alba L. Sp. Pl. 997. 1753.
Juglans tomentosa Lam. Encycl. 4: 504. 1797.
Carya tomentosa Nutt. Gen. 2: 221. 1818.
Hicoria alba Britton, Bull. Torr. Club, 15: 283. 1888.

A large tree, maximum height 100°, and trunk diameter 3½°, the foliage and twigs persistently tomentose-pubescent, fragrant when crushed, the bark rough and close; bud-scales very large, imbricated; leaflets 7–9, oblong-lanceolate or the upper oblanceolate or obovate, sessile, long-acuminate, narrowed or rounded and somewhat inequilateral at the base; staminate aments peduncled in 3's, tomentose; middle lobe of the staminate calyx linear, much longer than the lateral ones; fruit globose or oblong-globose, 1½′–3½′ long; husk thick, freely splitting to the base; nut grayish-white, angled, pointed at the summit, little compressed, thick-shelled, 4-celled at the base; seed sweet.

In rich soil, eastern Massachusetts to southern Ontario, Illinois and Nebraska, south to Florida and Texas. Ascends to 3500 ft. in Virginia. Wood very hard and tough, dark brown; weight per cubic foot 51 lbs. Called also Fragrant Hickory. May–June. Fruit ripe Oct.–Nov.

7. Hicoria microcàrpa (Nutt.) Britton. Small-fruited Hickory. (Fig. 1157.)

Juglans alba odorata Marsh. Arb. Am. 68. 1785?
Carya microcarpa Nutt. Gen. 2: 221. 1818.
H. microcarpa Britton, Bull. Torr. Club. 15: 283. 1888.
H. glabra var. *odorata* Sarg. Silva, 7: 167. *pl. 354.* 1895.

A forest tree, reaching a maximum height of about 90° and a trunk diameter of 3½°, the bark close, when older separating in narrow plates, the foliage glabrous throughout. Bud-scales 6–8, imbricated, the inner ones somewhat enlarging; leaflets 5–7, oblong, or ovate-lanceolate, acuminate at the apex, narrowed or sometimes rounded at the base, 3½′–5′ long; staminate aments glabrous, peduncled in 3's at the base of shoots of the season; middle lobe of the staminate calyx equalling or somewhat longer than the lateral ones; fruit globose or globose-oblong, less than 1′ long, the husk thin, tardily and incompletely splitting to the base; nut subglobose, nearly white, slightly compressed, not angled, thin-shelled, pointed; seed sweet.

In rich woods, Massachusetts to Michigan, south to Virginia, Illinois and Missouri. Wood hard, strong, tough, light brown. May–June. Fruit ripe Sept.–Oct.

8. Hicoria glàbra (Mill.) Britton. Pig-nut Hickory. (Fig. 1158.)

Juglans glabra Mill. Gard. Dict. Ed. 8, No. 5. 1768.
Carya porcina Nutt. Gen. 2: 222. 1818.
Hicoria glabra Britton, Bull. Torr. Club, 15: 284. 1888.

A tree, sometimes 120° high and with a trunk diameter of 5°, bark close, rough; foliage glabrous, or sometimes pubescent. Bud-scales 8–10, imbricated, the inner ones enlarging; leaflets 3–7, rarely 9, oblong, oblong-lanceolate or the upper obovate, sessile, acuminate at the apex, mostly narrowed at the base, 3′–6′ long, in young plants much larger; staminate aments glabrous, peduncled in 3's; lobes of the staminate calyx about equal in length, the middle one narrower; fruit obovoid or obovoid-oblong, 1½′–2′ long; husk thin, the valves very tardily dehiscent; nut brown, angled, pointed, very thick-shelled; seed astringent and bitter, not edible.

In dry or moist woods, Maine to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood hard, strong, tough, rather dark brown; weight per cubic foot 51 lbs. May–June. Fruit ripe Oct.–Nov.

Family 3. MYRICÀCEAE Dumort. Anal. Fam. 95. 1829.

BAYBERRY FAMILY.

Shrubs or trees with alternate, mostly coriaceous and aromatic simple leaves and small monoecious or dioecious flowers, in linear, oblong or globular bracted aments. Flowers solitary in the axils of the bracts. Perianth none. Staminate flower with 2–16 (usually 4–8) stamens inserted on the receptacle; filaments short, distinct or somewhat united; anthers ovate, 2-celled, the sacs longitudinally dehiscent. Pistillate flowers with a solitary 1-celled ovary, subtended by 2–8 bractlets; ovule solitary, orthotropous; style very short; stigmas 2, linear. Fruit a small oblong or globose drupe or nut, the exocarp often waxy. Seed erect. Endosperm none. Cotyledons plano-convex. Radicle very short.

Two genera and 35 species of wide geographic distribution.

Ovary subtended by 2–4 bractlets; leaves serrate or entire, exstipulate. 1. *Myrica.*
Ovary subtended by 8 linear persistent bractlets; leaves pinnatifid, stipulate. 2. *Comptonia.*

1. MYRÌCA L. Sp. Pl. 1024. 1753.

Shrubs or small trees with entire, dentate or lobed, mostly resinous-dotted leaves, our species usually dioecious. Staminate aments oblong or narrowly cylindric, expanding before or with the leaves. Stamens 4–8. Pistillate aments ovoid or subglobose; ovary subtended by 2–4, mostly short, deciduous or persistent bractlets. Drupe globose or ovoid, its exocarp waxy. [Ancient Greek name of the Tamarisk.]

Besides the following species, another occurs in the Southern States and 2 on the Pacific coast.

Bractlets of pistillate aments persistent, clasping the drupes; low bog shrub. 1. *M. Gale.*
Bractlets of pistillate aments deciduous, the ripe drupes separated.
Slender tree; leaves mostly acute, narrow; drupe less than 1″ in diameter. 2. *M. cerifera.*
Shrub; leaves mostly obtuse, broader; drupe 1″–1½″ in diameter. 3. *M. Carolinensis.*

1. Myrica Gàle L. Sweet Gale. (Fig. 1159.)

Myrica Gale L. Sp. Pl. 1024. 1753.

A shrub, usually strictly dioecious, the twigs dark brown. Leaves oblanceolate, obtuse and dentate at the apex, narrowed to a cuneate entire base, short-petioled, dark green and glabrous above, pale and puberulent or glabrous beneath, 1′–2½′ long, 5″–10″ wide, unfolding after the aments; staminate aments linear-oblong, 6″–10″ long, crowded; pistillate aments ovoid-oblong, obtuse, about 4″ long and 2″ in diameter in fruit, their bracts imbricated; drupe resinous-waxy, not longer than the 2 ovate persistent bractlets, which clasp it on each side and are adnate to its base.

In swamps and along ponds and streams, Newfoundland to Alaska, southern New York, Virginia, Michigan and Washington. Also in Europe and Asia. Ascends to 3000 ft. in the Adirondacks. April–May.

2. Myrica cerífera L. Wax-myrtle. (Fig. 1160.)

Myrica cerifera L. Sp. Pl. 1024. 1753.

A slender dioecious tree, maximum height about 40°, trunk diameter 1½°, the bark gray, nearly smooth. Leaves narrow, oblong or oblanceolate, mostly acute at the apex, entire or sparingly dentate, narrowed or somewhat cuneate at the base, fragrant when crushed, short-petioled, dark green above, paler and sometimes pubescent beneath; golden-resinous, 1′–3′ long, 3″–9″ wide, unfolding with or before the aments; staminate aments cylindric; pistillate aments short, oblong; ripe drupes separated, globose, bluish-white, waxy, less than 1″ in diameter, tipped with the minute base of the style, long persistent, the bracts and bractlets deciduous.

In sandy swamps or wet woods, Maryland to Florida and Texas, north to Arkansas. March–April. Leaves mostly persistent through the winter. Wood light, brown; weight per cubic foot 35 lbs.

3. Myrica Carolinénsis Mill. Waxberry. Bayberry. (Fig. 1161.)

Myrica Carolinensis Mill. Gard. Dict. Ed. 8, no. 3. 1768.

A shrub, 2°–8° high, with smooth gray bark, the twigs glabrous or often pubescent. Leaves oblanceolate or obovate, glabrous above, often pubescent beneath, resinous, 2′–4′ long, 6″–18″ wide, serrate with a few low teeth above the middle, or entire, obtuse or sometimes acute at the apex, narrowed at the base, short-petioled; staminate aments cylindric or oblong, 3″–9″ long; pistillate aments short, oblong; ripe drupes separated, globose, bluish white, very waxy, 1″–1½″ in diameter, long-persistent, the bracts and bractlets deciduous.

In dry or moist sandy soil, Nova Scotia to Florida and Alabama and on the shores of Lake Erie. Occurs also in bogs in northern New Jersey and Pennsylvania. April–May. The fruit was much used as a source of wax by the early settlers of the eastern United States, and is still utilized along the coast of New England.

2. COMPTÒNIA Banks; Gaertn. Fr. & Sem. 2: 58. *pl. 90.* 1791.

A low, monoecious or dioecious branching shrub with terete brown branches and narrow, deeply pinnatifid, stipulate leaves, the young foliage pubescent. Aments expanding with the leaves, the staminate ones and their flowers as in *Myrica*. Fertile aments globose-ovoid, on monoecious plants appearing below the staminate, several-flowered. Ovary subtended by 8 linear-subulate persistent bractlets, which form an involucre to the ovoid-oblong bony nut. [Name in honor of Rev. Henry Compton, 1632–1713, bishop of Oxford.]

A monotypic genus of eastern North America.

1. Comptonia peregrina (L.) Coulter. Sweet Fern. (Fig. 1162.)

Liquidambar peregrina L. Sp. Pl. 999. 1753.
Myrica asplenifolia L. Sp. Pl. 1024. 1753.
Liquidambar asplenifolia L. Sp. Pl. Ed. 2, 1418. 1763.
C. asplenifolia Gaertn. Fr. & Sem. 2: 58. 1791.
C. peregrina Coulter, Mem. Torr. Clnb, 5: 127. 1894.

A shrub, 1°–2½° tall, the branches erect or sprcading. Leaves linear-oblong or linear-lanceolate in outline, short-petioled, obtuse or subacnte at the apex, deeply pinnatifid into numerons oblique ronnded entire or sparingly dentate lobes, 3′–6′ long, ¼′–½′ wide, fragrant when crushed, the sinuses very narrow; stipules semi-cordate, mostly deciduous; staminate aments clustered at the ends of the branches, 1′ or less long, their bracts reniform, acute; pistillate aments bur-like in fruit, the snbnlate bractlets longer than the light brown, shining, striate, obtnse nut.

In dry soil, especially on hill-sides, Nova Scotia to Manitoba, sonth to North Carolina, Indiana and Michigan. Ascends to 2000 ft. in Virginia. April-May.

Family 4. LEITNERIÀCEAE Drude, Phanerog. 407. 1879.

Cork-wood Family.

Dioecious shrubs or small trees, with large entire petioled alternate exstipulate (or sometimes stipulate?) leaves, and flowers of both sexes in aments, which expand before the leaves. Staminate flowers with no perianth: stamens 8–12, inserted on the receptacle; filaments distinct; anthers oblong, erect, 2-celled, the sacs longitudinally dehiscent. Pistillate flowers with a solitary 1-celled ovary, subtended by 3 or 4 minute glandular-lacerate bractlets (perianth?); style terminal, simple, grooved and flattened, slender, recurved and stigmatic above, caducous; ovule solitary, laterally affixed to the ovary wall, amphitropous. Fruit an oblong drupe with thin exocarp and hard endocarp. Testa thin. Endosperm thin, fleshy. Cotyledons flat, cordate at the base; radicle short, superior.

A family related morphologically to the Myricaceae, bnt its anatomical characteristics point to affinity with *Liquidambar* and *Platanus*. It comprises only the following monotypic genns of the southern United States.

1. LEITNÈRIA Chapm. Fl. S. States, 427. 1860.

Characters of the family. [In honor of Dr. E. F. Leitner, a German naturalist, killed in Florida during the Seminole war.]

1. Leitneria Floridàna Chapm. Leitneria. Cork-wood. (Fig. 1163.)

Leitneria Floridana Chapm. Fl. S. States, 428. 1860.

A shrub or small tree, attaining a maximnm height of abont 20° and a trunk diameter of 5′, the bark gray and rather smooth, the young twigs, leaves and aments densely pubescent. Leaves oblong or elliptic-lanceolate, acute, obtuse or cuspidate at the apex, narrowed at the base, bright green, firm, 3′–6′ long, 1′–3′ wide, when mature, glabrous or nearly so above, finely pubescent, at least on the veins, and rngose-reticulated beneath; petioles 9″–15″ long; staminate aments ascending, 1′–2′ long, their bracts triangular-ovate, acute, tomentose; pistillate aments shorter, borne toward the ends of the twigs; drnpe slightly compressed, about 10″ long, 3″–4″ thick, rugose-reticulated.

In swamps, southern Missouri to Texas, and in Florida. Wood lighter than cork and probably the lightest wood known, weighing only about 12½ lbs. per cubic foot. March.

Family 5. SALICÀCEAE Lindl. Nat. Syst. Ed. 2, 186. 1836.

WILLOW FAMILY.

Dioecious trees or shrubs with light wood, bitter bark, brittle twigs, alternate stipulate leaves, the stipules often minute and caducous. Flowers of both sexes in aments, solitary in the axil of each bract. Aments expanding before or with the leaves. Staminate aments often pendulous; staminate flowers consisting of from one to numerous stamens inserted on the receptacle, subtended by a gland-like or cup-shaped disk; filaments distinct or more or less united; anthers 2-celled, the sacs longitudinally dehiscent. Pistillate aments pendulous, erect or spreading, sometimes raceme-like; pistillate flowers of a sessile or short-stipitate 1-celled ovary subtended by a minute disk; placentae 2–4, parietal; ovules usually numerous, anatropous; style short, slender, or almost wanting; stigmas 2, simple or 2–4-cleft. Fruit an ovoid, oblong or conic 2–4-valved capsule. Seeds small or minute, provided with a dense coma of long, mostly white, silky hairs. Endosperm none. Cotyledons plano-convex. Radicle short.

The family includes only the 2 following genera, consisting of 200 or more species, mostly natives of the north temperate and arctic zones.

Bracts fimbriate or incised; stamens numerous; stigmas elongated. 1. *Populus.*
Bracts entire; stamens 2–10; stigmas short. 2. *Salix.*

1. PÓPULUS L. Sp. Pl. 1034. 1753.

Trees with scaly resinous buds, terete or angled twigs and broad or narrow, usually long-petioled leaves, the stipules minute, fugacious. Bracts of the aments fimbriate or incised. Disk cup-shaped, oblique, lobed or entire. Staminate aments dense, pendulous. Staminate flowers with from 4–60 stamens, their filaments distinct. Pistillate aments sometimes raceme-like through the elongation of the pedicels, pendulous, erect or spreading. Ovary sessile; style short, stigmas 2–4, entire or 4-lobed. Capsule 2–4-valved. Coma of the seeds often very long and conspicuous. [Name ancient, used for these trees by Pliny.]

About 25 species, natives of the northern hemisphere. Besides the following, some 3 others occur in the western parts of North America.

* Petioles terete or channeled, scarcely or not at all flattened laterally. (POPLARS.)

Leaves persistently and densely white-tomentose beneath. 1. *P. alba.*
Leaves glabrous or very nearly so when mature, crenulate.
  Foliage strictly glabrous (except in *P. balsamifera candicans*); capsule very short-pedicelled.
    Leaves broadly ovate, rounded or cordate at the base. 2. *P. balsamifera.*
    Leaves lanceolate or ovate-lanceolate, mostly narrowed at the base.
      Leaves acute, short-petioled. 3. *P. angustifolia.*
      Leaves acuminate, long-petioled. 4. *P. acuminata.*
  Foliage densely tomentose when young; capsules slender-pedicelled. 5. *P. heterophylla.*

** Petioles strongly flattened laterally. (ASPENS.)

Leaves coarsely undulate-dentate. 6. *P. grandidentata.*
Leaves crenulate-denticulate.
  Leaves ovate or suborbicular, short-pointed. 7. *P. tremuloides.*
  Leaves broadly deltoid, abruptly acuminate.
    Leaves obtuse at the base; capsules nearly sessile. 8. *P. nigra.*
    Leaves truncate at the base; capsules slender-pedicelled. 9. *P. deltoides.*

1. Populus álba L. Abele. White or Silver-leaf Poplar. (Fig. 1164.)

Populus alba L. Sp. Pl. 1034. 1753.

A large tree, with smooth light gray bark, attaining a maximum height of about 120° and a trunk diameter of 6°. Young foliage densely white-tomentose, the leaves becoming glabrate and dark green above, persistently tomentose beneath, broadly ovate or nearly orbicular in outline, apex acute, base truncate or subcordate, 3–5-lobed or irregularly dentate, 2½′–4′ long; petioles nearly terete, shorter than the blade; staminate aments 1′–2′ long.

In yards and along roadsides, springing up from suckers of older trees. New Brunswick to Virginia. Native of Europe and Asia. Wood soft, nearly white; weight 38 lbs. per cubic foot. March–May.

2. Populus balsamífera L. Tacamahac. Balsam Poplar. (Fig. 1165.)

Populus balsamifera L. Sp. Pl. 1034. 1753.

A large tree, with nearly smooth gray bark, reaching a maximum height of about 80° and a trunk diameter of 7°, the branches stout, spreading, the large buds very resinous, the foliage glabrous. Leaves broadly ovate, dark green and shining above, pale beneath, acute or acuminate at the apex, rounded or subcordate at the base, crenulate, 3′–5′ long, petioles terete; aments and bracts somewhat pubescent; stamens 18–30; lobes of the stigmas broad; capsule ovoid, 2-valved, short-pedicelled.

In moist or dry soil, especially along streams and lakes, Newfoundland to Hudson Bay and Alaska, south to Maine, New York, Michigan, Idaho and British Columbia. Wood soft, weak, brown, compact; weight per cubic foot 23 lbs. April.

Populus balsamifera cándicans (Ait.) A. Gray, Man. Ed. 2, 419. 1856. BALM OF GILEAD.

Populus candicans Ait. Hort. Kew. 3: 406. 1789.

Leaves broader, cordate at the base; petioles usually pubescent. New Brunswick to New Jersey, west to Minnesota, mostly escaped from cultivation, apparently indigenous northward.

3. Populus angustifòlia James. Narrow-leaved Cottonwood. (Fig. 1166.)

Populus angustifolia James, Long's Exp. 1: 497. 1823.
Populus balsamifera var. *angustifolia* S. Wats. Bot. King's Exp. 327. 1871.

A slender tree, maximum height about 65°, trunk diameter 2°; crown narrowly pyramidal, branches ascending, foliage glabrous. Twigs terete, gray; leaves lanceolate, ovate-lanceolate or ovate, spreading, drying brownish, gradually acuminate or acute at the apex or some of them obtuse, narrowed, rounded or rarely subcordate at the base, 2′–4½′ long, ½′–1¼′ wide, finely crenulate from base to apex; petioles plano-convex, not flattened laterally; ¼′–½′ long; lateral veins 8–15 on each side of the blade; staminate aments oblong-cylindric, 1′–2½′ long; lobes of the stigmas broad; capsules ovoid, short-pedicelled.

In moist soil, especially along streams, Northwest Territory to Dakota, Nebraska, New Mexico, and Arizona. Wood soft, weak, brown, compact; weight per cubic foot 24 lbs. April–May.

4. Populus acuminàta Rydberg. Black Cottonwood. (Fig. 1167.)

Populus acuminata Rydberg, Bull. Torr. Club, 20: 50. 1893.

A slender tree, with terete twigs, reaching approximately the dimensions of the preceding species, the crown broadly pyramidal with spreading branches, the foliage glabrous. Leaves rhomboid-lanceolate, spreading or drooping, drying green, abruptly or gradually long-acuminate at the apex, cuneate, obtuse or rounded at the base, 2′–6′ long, 1′–2½′ wide, crenulate or the base entire; petioles slender, 1′–2½′ long; staminate aments about 1½′ long; pistillate aments slender, drooping, 3′–5′ long; capsules ovoid, obtuse, distinctly pedicelled.

Range apparently nearly that of the preceding species. April–May.

5. Populus heterophýlla L. Swamp or Downy Poplar. (Fig. 1168.)

Populus heterophylla L. Sp. Pl. 1034. 1753.

An irregularly branching tree, sometimes 80° high and with a trunk 3° in diameter, the bark rough. Young foliage densely tomentose. Leaves long-petioled, broadly ovate, obtuse or subacute at the apex, rounded, truncate or subcordate at the base, crenulate-denticulate, 5′–6′ long, or those of young plants much larger, glabrous or somewhat floccose beneath when mature; petioles terete; bracts glabrous or nearly so; staminate aments stout, 3′–4′ long, 9″–12″ in diameter, drooping; stamens numerous; pistillate aments raceme-like, peduncled, erect or spreading, loosely flowered; capsules ovoid, acute, 2-valved, 4″–6″ long, shorter than or equalling their pedicels.

In swamps, southern Connecticut and New York to Georgia, west to Louisiana, north in the Mississippi Valley to Indiana and Arkansas. Wood soft, weak, compact, brown, weight per cubic foot 26 lbs. April–May.

6. Populus grandidentàta Michx. Large-toothed Aspen. (Fig. 1169.)

Populus grandidentata Michx. Fl. Bor. Am. 2: 243. 1803.

A forest tree with smooth, greenish-gray bark, maximum height about 75°, and trunk diameter 2½°. Leaves ovate-orbicular, those of very young plants densely white-tomentose beneath, sometimes 1° long, with irregularly denticulate margins, those of older trees tomentose when young, glabrous when mature, short-acuminate, coarsely undulate-dentate, obtuse or truncate at the base 2½′–4′ long; petioles slender, flattened laterally; bracts silky, irregularly 4–7-cleft; staminate aments 2′–4′ long, about 5″ in diameter, drooping; pistillate aments somewhat pubescent, dense, 3′–5′ long in fruit, also drooping; stigma-lobes narrow; capsule conic, acute, 2-valved, about 3″ long, rather less than 1″ in diameter, papillose.

In rich woods, Nova Scotia to Ontario and Minnesota, south to New Jersey and in the Alleghanies to North Carolina and Tennessee. Wood soft, weak, light brown, compact; weight per cubic foot 29 lbs. April.

7. Populus tremuloìdes Michx. American Aspen. (Fig. 1170.)

Populus tremuloides Michx. Fl. Bor. Am. 2: 243. 1803.
P. Atheniensis Ludwig, Neue Wilde Baumz. 35. 1753.(?)

A slender tree, with smooth, light green bark, reaching a maximum height of about 100° and a trunk diameter of 3°, the young foliage glabrous, excepting the ciliate margins of the leaves. Petioles very slender, flattened laterally, causing the leaves to quiver in the slightest breeze; leaves broadly ovate or orbicular, short-acuminate at the apex, finely crenulate all around, truncate, rounded or subcordate at base, 1′–2½′ broad, or those of very young plants much larger; bracts silky, deeply 3–5-cleft into linear lobes; aments drooping, the staminate 1½′–2½′ long, 3″–4″ in diameter, the pistillate longer, dense; stigma-lobes linear; capsule like that of the preceding species, but somewhat smaller.

In dry or moist soil, Newfoundland to Hudson Bay and Alaska, south to New Jersey, Pennsylvania, Kentucky, in the Rocky Mountains to Mexico and to Lower California. Ascends to 3000 ft. in the Adirondacks. Wood soft, weak, light brown; weight per cubic foot, 25 lbs. March–May.

8. Populus nigra L. Black Poplar. (Fig. 1171.)

Populus nigra L. Sp. Pl. 1034. 1753.

A large tree, sometimes 100° tall and the trunk 4° in diameter, usually much smaller. Twigs terete; young foliage somewhat pubescent, the mature leaves firm, nearly or quite glabrous; petioles slender, flattened laterally; leaves broadly deltoid, abruptly acuminate at the apex, broadly cuneate or obtuse at the base, crenate, 2′–4′ long; staminate aments 1′–2′ long; stamens about 20; pistillate aments 2′–5′ long in fruit, spreading; capsule oblong, very obtuse, borne on pedicels of much less than their own length.

Valleys of the Hudson and Delaware Rivers, naturalized from Europe. April–May.

The Lombardy Poplar, *Populus dilatata*, commonly planted for ornament, occasionally spreads by sending up shoots from its subterranean parts.

9. Populus deltoides Marsh. Cottonwood. Necklace Poplar. (Fig. 1172.)

Populus deltoides Marsh. Arb. Am. 106. 1785.
Populus Carolinensis Moench, Verz. Pl. 81. 1785.
Populus monilifera Ait. Hort. Kew. 3: 406. 1789.
Populus angulata Ait. Hort. Kew. 3: 407. 1789.

A large tree, the greatest of the poplars, attaining a maximum height of 150° and a trunk diameter of 7½°, the bark grayish-green, somewhat rough when old. Foliage glabrous; leaves broadly deltoid-ovate, abruptly acuminate at the apex, crenulate, truncate at the base, 4′–7′ long; petiole flattened laterally, stout, about as long as the blade; bracts glabrous, deeply fimbriate; staminate aments drooping, 3′–5′ long, 5″–6″ in diameter; pistillate aments loosely flowered, becoming 6′–10′ long in fruit; capsule ovoid, acute, 4″–5″ long, 2–4-valved, shorter than or equalling their pedicels.

In moist soil, especially along streams and lakes, Quebec to the Northwest Territory, south to New Jersey, Florida, Colorado and New Mexico. Wood soft, weak, dark brown; weight per cubic foot 24 lbs. April–May. Also called Carolina Poplar.

2. SALIX L. Sp. Pl. 1015. 1753.

Trees or shrubs, with single-scaled buds, the scales with an adherent membrane within, mostly narrow and short-petioled leaves and persistent or early deciduous broad or minute stipules. Bracts of the aments entire. Disk gland like, small or minute. Staminate aments dense, erect, spreading or drooping. Staminate flowers with 1–10, mostly 2, stamens, their filaments distinct or sometimes united. Pistillate aments usually erect or spreading. Ovary sessile or short-stipitate. Style short or filiform. Stigmas 2, entire or 2-cleft. Capsule mostly 2-valved. [Name ancient.]

About 160 species, of wide geographic distribution throughout the north temperate and arctic zones, a few in the southern hemisphere. Besides the following, some 45 others occur in the northern and western parts of North America.

* Filaments pubescent, at least toward the base; stamens more than 2 (3–7).

No glands on petioles or stipules.
Capsule ovoid, about twice as long as its pedicel.
Leaves short-petioled, lanceolate.
Leaves narrowly lanceolate, green on both sides. — 1. *S. nigra.*
Leaves lanceolate, silvery-white beneath. — 2. *S. Wardi.*
Leaves slender-petioled, broadly lanceolate. — 3. *S. amygdaloides*
Capsule long-conic, much longer than its pedicel. — 5. *S. fragilis.*
Petioles and stipules prominently glandular. — 4. *S. lucida.*

** Filaments pubescent; stamens only 2.

Trees, cultivated and naturalized or adventive.

Capsule glabrous; filaments distinct.
Branches not drooping; leaves lanceolate.
Leaves glabrous on both sides. 5. *S. fragilis.*
Leaves silky on both sides when young. 6. *S. alba.*
Leaves linear-lanceolate; branches drooping. 7. *S. Babylonica.*
Capsules tomentose; filaments united; leaves oblanceolate. 8. *S. purpurea.*
River-bank shrub, with linear-lanceolate leaves. 9. *S. fluviatilis.*
Low arctic shrubs, with obovate or oval obtuse leaves.
Leaves glabrous, strongly reticulated beneath. 10. *S. reticulata.*
Leaves densely tomentose-silky beneath. 11. *S. vestita.*

*** Filaments glabrous; capsule tomentose or pubescent.

Stigmas sessile or very nearly so.
Leaves tomentose beneath.
Leaves oblong-lanceolate, slender-petioled; aments expanding with the leaves. 12. *S. Bebbiana.*
Leaves oblanceolate, short-petioled; aments expanding before the leaves.
Leaves 2′–4′ long; fruiting aments about 1′ long. 13. *S. humilis.*
Leaves 1′–2′ long; fruiting aments ½′ long. 14. *S. tristis.*
Mature leaves glabrous or slightly silky beneath.
Leaves oblong or oblong-lanceolate, acute. 15. *S. discolor.*
Leaves elongated-lanceolate, long-acuminate.
Capsule short-pedicelled, 1½″ long; leaves black in drying. 16. *S. sericea.*
Capsule slender-pedicelled, 2″–3″ long; leaves green in drying. 17. *S. petiolaris.*
Style filiform, equalling or longer than the stigmas.
Leaves persistently tomentose or silky beneath.
Arctic or alpine shrubs; aments unfolding with the leaves.
Fruiting aments 1′ or less long.
Pubescence silvery-silky. 18. *S. argyrocarpa.*
Pubescence tomentose. 19. *S. desertorum.*
Fruiting aments 2′–3′ long. 20. *S. glauca.*
Low bog shrub; leaves oblong. 21. *S. candida.*
Introduced tree; leaves linear-lanceolate, long-acuminate. 22. *S. viminalis.*
Mature leaves glabrous beneath.
Leaves 2′–3′ long, shining above. 23. *S. phyllicifolia.*
Leaves ½′–2′ long, dull; low arctic shrubs.
Leaves oblong or lanceolate, short-petioled. 24. *S. Brownii.*
Leaves elliptic or broadly obovate, long-petioled. 25. *S. arctica.*

**** Filaments glabrous; capsule glabrous.

Large shrubs, with serrate or serrulate leaves.
Mature leaves glabrous.
Leaves lanceolate or ovate-lanceolate, acuminate.
Shrubs.
Leaves green both sides, narrow; capsules 2″–3″ long. 26. *S. cordata.*
Leaves very glaucous beneath, broad; capsules 3″–5″ long. 27. *S. glaucophylla.*
Tree 30°–50° high. 28. *S. Missouriensis.*
Leaves elliptic, obovate or oblong, merely acute.
Leaves glaucous beneath; capsule slender-pedicelled. 29. *S. balsamifera.*
Leaves green both sides; capsule nearly or quite sessile. 30. *S. Barclayi.*
Leaves densely silky-pubescent. 31. *S. adenophylla.*
Low bog shrub, with entire glabrous leaves. 32. *S. myrtilloides.*
Low diffuse glabrous alpine and arctic shrubs.
Leaves oblong or obovate, narrowed at the base; aments many-flowered. 33. *S. Uva-ursi.*
Leaves orbicular, cordate at the base; pistillate aments few-flowered. 34. *S. herbacea.*

1. Salix nigra Marsh. Black Willow. (Fig. 1173.)

Salix nigra Marsh. Arb. Am. 139. 1785.

A tree, with rough flaky dark brown bark, attaining a maximum height of about 120° and a trunk diameter of 3°. Leaves narrowly lanceolate, acute or acuminate at the apex, narrowed at the base, short-petioled, serrulate, somewhat pubescent when young, glabrous and green above, somewhat paler, and sometimes pubescent on the veins beneath when mature, 2½′–5′ long, 2″–9″ wide; stipules various, persistent or deciduous; aments expanding with the leaves, on short lateral branches, the staminate 1′–2′ long, the pistillate 1½′–3′ long and spreading in fruit; stamens 3–7, distinct, their filaments pubescent below; scales deciduous; stigmas nearly sessile; capsule ovoid, acute, glabrous, about twice as long as its pedicel.

Along streams and lakes, New Brunswick to western Ontario, Florida and California. Hybridizes with *S. alba.* Wood soft, weak, light brown; weight per cubic foot 28 lbs. April–May.

Salix nigra falcata (Pursh) Torr. Fl. N. Y. 2: 209. 1843.
Salix falcata Pursh, Fl. Am. Sept. 2: 614. 1814.
Leaves narrower, 2″–3″ wide, falcate, green on both sides. Massachusetts to Florida.

2. Salix Wàrdii Bebb. Ward's Willow. (Fig. 1174.)

Salix nigra var. *Wardi* Bebb; Ward, Bull. U. S. Nat. Mus. 22: 114. 1881.
Salix Wardi Bebb, Gard. & For. 8: 363. 1895.

A tree, sometimes 30° high, the trunk reaching 8′ in diameter, the branches spreading or drooping, the bark dark reddish brown, covered with small scales. Leaves lanceolate or oblong-lanceolate, long-acuminate or acute at the apex, rounded, subcordate, or some of them narrowed at the base, 2½′–7′ long, ½′–1½′ wide, bright green above, silvery white and usually somewhat pubescent beneath; stipules often large, sometimes persistent; aments expanding with the leaves, terminal, the staminate 2′–4′ long, the pistillate as long or shorter; stamens 3–6, separate; filaments pilose at the base; scales villous without, deciduous; capsule conic, glabrous, about twice as long as its pedicel.

Along streams and lakes, Maryland to Tennessee, Missouri and the Indian Territory, south to Florida. Wood dark brown. March–May.

3. Salix amygdaloìdes Anders. Peach-leaved Willow. (Fig. 1175.)

Salix amygdaloides Anders. Ofv. Handl. Vet. Akad. 1858: 114. 1858.

A small tree, similar to the preceding species, sometimes 70° high and the trunk 2° in diameter, the brown bark scaly. Leaves lanceolate or ovate-lanceolate, pubescent when young, glabrous when old, dark green above, paler and slightly glaucous beneath, long-acuminate at the apex, narrowed at the base, 3½′–5′ long, about 1′ wide, sharply serrulate, slender-petioled; petioles 3″–7″ long, glandless; stipules commonly fugacious; aments appearing with the leaves, terminal on short lateral branches, the staminate 1′–2′ long, the pistillate loose, spreading and 2½′–4′ long in fruit; stamens more than 2; filaments distinct, pubescent at the base; scales deciduous; stigmas nearly sessile; capsule narrowly ovoid, acute, glabrous, at length about as long as its filiform pedicel.

On lake and river shores, Quebec to British Columbia, New York, Missouri and New Mexico. Wood soft, weak, light brown; weight 28 lbs. April–May.

4. Salix lùcida Muhl. Shining Willow. Glossy Willow. (Fig. 1176.)

Salix lucida Muhl. Neue Schrift. Ges. Nat. Fr. Berlin, 4: 239. *pl. 6. f. 7.* 1803.

A tall shrub, or sometimes a tree 20° high, the bark smooth or slightly scaly, the twigs yellowish-brown, shining. Leaves lanceolate, ovate-lanceolate or ovate, mostly long-acuminate, narrowed or rounded at the base, sharply serrulate all around, green and glossy on both sides or bearing a few, scattered hairs when very young, 3′–5′ long, 1′–1½′ wide when mature; stipules small, semi-cordate or oblong, very glandular, commonly persistent; petioles stout, 3″–6″ long, glandular at the base of the blade; aments on short, lateral leafy branches, the staminate stout, 1′–2′ long, the pistillate dense, 2′–3′ long in fruit, often long-persistent; bracts deciduous; stamens about 5; filaments pubescent below; stigmas nearly sessile; capsule narrowly ovoid, acute, glabrous, much longer than its pedicel.

In swamps and along streams and lakes, Newfoundland to the Northwest Territory, New Jersey, Kentucky and Nebraska. A most beautiful willow. April–May.

5. Salix frágilis L. Crack Willow. Brittle Willow. (Fig. 1177.)

Salix fragilis L. Sp. Pl. 1017. 1753.

A tall, slender tree, with roughish gray bark, attaining a maximum height of about 80° and a trunk diameter of 7°, twigs reddish green, very brittle at the base. Leaves lanceolate, long-acuminate, narrowed at the base, sharply serrulate, glabrous on both sides, rather dark green above, paler beneath, 3′–6′ long, ½′–1′ wide; glandular at the base of the blade; petioles 3″–8″ long, glandular above; stipules semicordate, fugacious; staminate aments 1′–2′ long; stamens 2, or sometimes 3–4; filaments pubescent below, distinct; pistillate aments 3′–5′ long in fruit, rather loose; stigmas nearly sessile; capsule long-conic, glabrous, 2½″–3″ long, short-pedicelled.

Escaped from cultivation, Massachusetts to New Jersey and Pennsylvania. Native of Europe. Hybridizes with the following species. The twigs break away and grow into new plants. April–May.

Salix frágilis decipiens (Hoffm.) Anders., with yellowish or red twigs and smaller brighter green leaves, appears to be known only in cultivation within our area.

6. Salix álba L. White Willow. Huntingdon Willow. (Fig. 1178.)

Salix alba L. Sp. Pl. 1021. 1753.

A large tree, sometimes 90° tall and a trunk diameter of 8°; bark gray, rough; twigs brittle at the base. Leaves lanceolate or oblong-lanceolate, acute or acuminate, narrowed at the base, serrulate, silky-pubescent on both sides when young, less so and pale or glaucous beneath when mature, 2′–4½′ long, 4″–8″ wide; stipules ovate-lanceolate, deciduous; petioles 2″–4″ long, glandless or sparingly glandular; aments on short lateral leafy branches; scales deciduous; stamens 2; filaments distinct, pubescent at the base; pistillate aments linear-cylindric, 1½′–2½′ long; stigmas nearly sessile; capsule ovoid, acute, glabrous, short-pedicelled or sessile.

In moist soil, especially along streams, New Brunswick and Ontario to Pennsylvania, sparingly escaped from cultivation. Native of Europe. April–May.

Salix álba coerùlea (J. E. Smith) Koch, Dendr. 2: 512. 1869. BLUE WILLOW.
Salix coerulea J. E. Smith, Engl. Bot. *pl. 2431.* 1801.

Mature leaves bluish-green, glabrous, glaucous beneath. Occasional in the Eastern States.

Salix álba vitellina (L.) Koch, Dendr. 2: 512. 1869. GOLDEN OSIER.
Salix vitellina L. Sp. Pl. Ed. 2, 1442. 1763.

Mature leaves glabrous above; twigs yellowish-green. The commonest form in North America.

7. Salix Babylónica L. Weeping Willow. Ring Willow. (Fig. 1179.)

Salix Babylonica L. Sp. Pl. 1017. 1753.

A large tree, with rough gray bark, sometimes attaining a height of 70° and a trunk diameter of 6°, the twigs slender, green, elongated, drooping. Leaves narrowly lanceolate, long-acuminate at the apex, serrulate all around, narrowed at the base, sparsely pubescent when young, glabrous when mature, green above, paler beneath, 4′–7′ long, 3″–6″ wide, sometimes curling into rings; petioles 3″–6″ long, glandular above; aments appearing on short lateral leafy branches; scales ovate-lanceolate, obtuse, deciduous; stamens 2; style almost none; capsule ovoid-conic, sessile, glabrous.

Widely cultivated and sometimes spreading by the distribution of its twigs. Native of Asia. April–May.

8. Salix purpùrea L. Purple Willow. (Fig. 1180.)

Salix purpurea L. Sp. Pl. 1017. 1753.

A slender shrub or small tree, with purplish flexible twigs, maximum height about 12°; branches often trailing; bark smooth and very bitter. Leaves oblanceolate or spatulate, acute, serrulate, narrowed at the base, short-petioled, glabrous, green above, paler and somewhat glaucous beneath, 1½′–3′ long, 2½″–4″ wide, some of them commonly subopposite; stipules minute; petioles 1″–2″ long, not glandular; aments appearing before the leaves, dense, leafy-bracted at the base, the staminate about 1′ long, the pistillate 1′–2′ long, sessile or nearly so; stamens 2; filaments and sometimes also the anthers united, pubescent; scales purple, persistent; stigmas very nearly sessile; capsules ovoid-conic, obtuse, tomentose, 2½″ long.

Sparingly escaped from cultivation in the Atlantic States. Native of Europe. Also called Bitter, Rose and Whipcord Willow. April–May.

9. Salix fluviátilis Nutt. Sandbar Willow. River-bank Willow. (Fig. 1181.)

Salix longifolia Muhl. Neue Schrift. Ges. Nat. Fr. Berlin, 4: 238. *pl. 6. f. 6.* 1803. Not Lam. 1778.
Salix fluviatilis Nutt. Sylva, 1: 73. 1842.

A much-branched shrub, 2°–12° high, forming thickets, or sometimes a slender tree, 20°–30° tall, and with a trunk 1° in diameter, the young foliage silky-pubescent, the mature leaves glabrous, or nearly so, those of seedlings pinnately dentate or lobed. Leaves linear-lanceolate or linear-oblong, 2½′–4′ long, 2½″–5″ wide, acuminate, remotely denticulate with somewhat spreading teeth, short-petioled, bright green; petioles not glandular; stipules minute or none; aments on short, leafy branches, linear-cylindric, the staminate dense, 1′–1½′ long, the pistillate looser, about 2′ long in fruit; scales deciduous; stamens 2; filaments pubescent, distinct; stigmas broad, sessile; capsule ovoid-conic, glabrous or silky, about 2″ long.

Along streams and lakes, Quebec to the Northwest Territory and Oregon, south to Virginia, Kentucky and New Mexico. Wood soft, reddish-brown; weight per cubic foot 31 lbs. April–May.

10. Salix reticulàta L. Net-veined Willow. (Fig. 1182.)

Salix reticulata L. Sp. Pl. 1018. 1753.

A procumbent shrub, 3′–10′ high, often sending out roots from the twigs, the young shoots 4-sided, purple-green. Leaves elliptic or obovate, thick, obtuse, narrowed, rounded or subcordate at the base, slender-petioled, glabrous or somewhat silky-pubescent when young, dark green above, not shining, glaucous and strongly reticulate-veined beneath, 1′–2′ long; petioles 4″–12″ long, channeled, not glandular; leaves obscurely crenulate or entire; stipules oblong, obtuse; aments terminal, long-stalked, dense; scales obtuse; stamens 2; filaments distinct, pubescent at the base; stigmas sessile; capsule ovoid-conic, sessile, glabrous or pubescent, about 3″ long.

Labrador and Quebec to Alaska, south in the Rocky Mountains to Colorado. Also in northern Europe and Asia. June.

11. Salix vestita Pursh. Hairy Willow. (Fig. 1183.)

Salix vestita Pursh, Fl. Am. Sept. 610. 1814.

A low shrub, similar to the preceding species, the twigs 4-sided, green. Leaves obovate, thick, mostly retuse or emarginate at the apex, slightly crenulate, narrowed or rounded at the base, dark green and glabrous above, persistently tomentose-silky beneath, short-petioled, 1′–2′ long; petioles 2″–4″ long, channeled, not glandular; aments terminal, unfolding after the leaves, stalked; stamens 2; filaments distinct; capsules narrowly ovoid-conic, sessile, densely silky-tomentose, about 3″ long.

Labrador and Quebec to the Northwest Territory. June.

12. Salix Bebbiàna Sarg. Bebb's Willow. (Fig. 1184.)

Salix rostrata Richards. Frank. Journ. App. 753. 1823. Not Thuill. 1799.
Salix Bebbiana Sarg. Gard. & For. 8: 463. 1895.

A shrub, 6°–18° tall, or sometimes a tree 25° high, the twigs pubescent or puberulent, terete. Leaves elliptic, oblong or oblong-lanceolate, acute, acuminate or some of them blunt at the apex, rounded or narrowed at the base, sparingly serrate or entire, dull green and puberulent above, pale, reticulate-veined and tomentose beneath or nearly glabrous on both sides when very old; petioles 2″–6″ long; stipules semicordate, acute, deciduous; aments sessile, expanding with or before the leaves, dense, the staminate 1′–1½′ long, the pistillate 2′ long in fruit; scales villous, persistent or deciduous; stamens 2; filaments distinct, glabrous; stigmas nearly sessile; capsule very narrowly long-conic, densely pubescent, twice as long as the filiform pedicel.

In dry soil and along streams, Anticosti to Hudson Bay and British Columbia, south to New Jersey, Pennsylvania, Nebraska and Utah. April–May.

13. Salix hùmilis Marsh. Prairie Willow. (Fig. 1185.)

Salix humilis Marsh. Arb. Am. 140. 1785.

A shrub, 2°–8° tall, the twigs tomentose or pubescent, terete. Leaves oblanceolate, petioled, 2′–4′ long, 4″–8″ wide, acute at both ends or the lower broader and obtuse at the apex, sparingly denticulate, the margins slightly revolute, the upper surface dark green, dull, puberulent or glabrous, the lower densely and persistently gray-tomentose; petioles 2″–3″ long; stipules obliquely lanceolate or ovate, acute, commonly persistent; aments unfolding much before the leaves, sessile, ovoid-oblong, short, dense, the pistillate about 1′ long in fruit; stamens 2; filaments glabrous; stigmas nearly sessile; capsule narrowly conic, densely pubescent, much longer than its pedicel.

In dry soil, Nova Scotia to western Ontario, south to North Carolina, Tennessee and Nebraska. Hybridizes with *S. discolor*. April–May.

14. Salix tristis Ait. Dwarf Gray Willow. Sage Willow. (Fig. 1186.)

Salix tristis Ait. Hort. Kew. 3: 393. 1789.

A tufted, slender shrub, 1°–2° tall, the twigs terete, puberulent, the roots long and thick. Leaves oblanceolate or linear-oblong, acute or obtusish, somewhat undulate, green and puberulent or glabrous above, persistently and densely white-tomentose beneath, numerous, crowded, 1′–2′ long, their margins revolute; petioles about 1″ long; stipules minute, deciduous; aments expanding much before the leaves, dense, very small, comparatively few-flowered, sessile, the pistillate globose-ovoid and about ½′ long in fruit; scales persistent; stamens 2; filaments glabrous; stigmas sessile or nearly so; capsule ovoid with a long, slender beak, tomentulose, about 3″ long, much longer than its filiform pedicel.

In dry soil, Nova Scotia (?), Maine to Minnesota, south to Florida and Tennessee. March–April.

15. Salix discolor Muhl. Glaucous Willow. Pussy Willow. (Fig. 1187.)

Salix discolor Muhl. Neue Schrift. Ges. Nat. Fr. Berlin, 4: 234. *pl. 6. f. 1.* 1803.
Salix eriocephala Michx. Fl. Bor. Am. 2: 225. 1803.

A shrub or low tree, maximum height 25°, trunk diameter 1°; twigs puberulent or glabrous; young leaves sometimes pubescent. Mature leaves usually glabrous, bright green above, glaucous and nearly white beneath, oblong or oblong-lanceolate, acute at both ends, irregularly serrate or nearly entire, slender-petioled, 3′–5′ long, 8″–18″ wide; petioles 3″–12″ long; stipules obliquely lanceolate or semicordate, commonly deciduous; aments unfolding much before the leaves, dense, the pistillate 1½′–3′ long in fruit; scales persistent, obtuse, brown-purple, villous; stamens 2; filaments glabrous; stigmas nearly sessile; capsule narrowly conic, tapering to a slender beak, tomentose, 2½″–3″ long, much longer than its pedicel.

In swamps or on moist hillsides, Nova Scotia to Manitoba, Delaware and Missouri. Wood soft, weak, yellow-brown; weight per cubic foot 27 lbs. March–April.

Salix discolor prinoides (Pursh) Anders. in DC. Prodr. 16: Part 2, 209. 1868.
Salix prinoides Pursh, Fl. Am. Sept. 613. 1814.

Pistillate aments looser; capsules less tomentose; leaves commonly narrower. Range of the type.

16. Salix sericea Marsh. Silky Willow. (Fig. 1188.)

Salix sericea Marsh. Arb. Am. 140. 1785.

A shrub, 5°–12° tall, with slender purplish puberulent twigs, the young leaves densely silky-pubescent. Mature leaves glabrous or nearly so, lanceolate, acuminate, narrowed or obtuse at the base, serrulate all around with gland-tipped teeth, dark green above, paler and somewhat glaucous beneath, turning brown or black in drying, 2½′–4′ long, 5″–10″ wide; stipules narrow, deciduous; petioles 2″–7″ long, sometimes glandular; aments expanding before the leaves, sessile, usually with a few leafy bracts at the base, dense, the staminate about 1′ long, the pistillate 1′–1½′ long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style very short; capsule ovoid-oblong, obtuse, pubescent, short-pedicelled, about 1½″ long.

In swamps and along steams, Maine to Michigan and Virginia. May.

17. Salix petiolàris J. E. Smith. Slender Willow. (Fig. 1189.)

Salix petiolaris J. E. Smith, Trans. Linn. Soc. 6: 122. 1802.

A shrub, similar to the preceding species, but the young leaves only slightly silky, the branches slender, upright or ascending. Mature leaves lanceolate, acuminate at both ends, serrulate with blunt cartilaginous teeth, remaining green in drying, 4″–8″ wide; petioles 2″–5″ long; stipules deciduous; aments expanding before the leaves, the pistillate short-peduncled, usually rather loose, about 1′ long in fruit; stamens 2; filaments glabrous; stigmas nearly sessile; capsule tapering from an ovoid or oblong base, pubescent, 2″–3″ long, about twice as long as the filiform pedicel.

In swamps, New Brunswick to the Northwest Territory, south to Tennessee and Michigan. May.

Salix petiolàris grácilis Anders. in DC. Prodr. 16: Part 2, 235. 1868.
Salix gracilis Anders. Proc. Am. Acad. 4: 67. 1858.
Pedicels nearly as long as the capsules; leaves rather narrower. Range undetermined.

18. Salix argyrocàrpa Anders. Silver Willow. (Fig. 1190.)

S. argyrocarpa Anders. Mon. Sal. 107. *f. 60.* 1867.

An erect or diffuse shrub, 6′–20° high, the twigs dark green, nearly terete, shining. Leaves oblong or oblanceolate, acute at each end or the lower obtuse, short-petioled, entire or crenulate, bright green and glabrous above, persistently silvery-silky beneath, 1′–2′ long, 3″–6″ wide, the margins slightly revolute; aments unfolding with the leaves, leafy-bracted at the base, dense, 1′ or less long; scales persistent, villous; stamens 2, distinct, their filaments glabrous; style slender, longer than the stigmas; capsule oblong-conic, densely silvery, acute, 1″–1½″ long, about twice as long as its pedicel.

Labrador and Quebec to the White Mountains of New Hampshire. Hybridizes with *S. phylicifolia*. June–July.

19. Salix desertòrum Richards. Desert Willow. (Fig. 1191.)

Salix desertorum Richards. Frank. Journ. App. 371. 1823.

A shrub, 6′–12′ high, with purplish-green twigs. Leaves oblong or oblanceolate, acute at the apex and cuneate at the base or the lower obtuse at both ends, entire or very nearly so, very short-petioled, tomentose on both sides or glabrate above when old, ½′–2′ long, 2″–4″ wide; stipules fugacious; aments expanding with the leaves, dense, ½′ or less long, leafy-bracted at the base; stamens 2; filaments glabrous; style about as long as the deeply 2-cleft stigmas; capsule ovoid-conic, acute, densely tomentose, about 2″ long, very short-pedicelled.

Anticosti and Quebec to western arctic America, south along the Rocky Mountains to Colorado. Summer.

20. Salix glaùca L. Northern Willow. (Fig. 1192.)

Salix glauca L. Sp. Pl. 1019. 1753.

A low arctic shrub, with terete brown twigs, the young shoots and leaves densely tomentose, becoming glabrate when old. Leaves elliptic or elliptic-lanceolate, entire, obtuse or acute at the apex, narrowed at the base, 1′–3′ long, ½′–1′ wide; petioles 1″–5″ long; stipules deciduous; aments borne on short leafy branches, the staminate dense, about 1′ long, the pistillate 2′–3′ long in fruit, rather loose; stamens 2; filaments distinct; scales persistent, densely white-villous; capsule ovoid-conic, densely white-tomentose, sessile or very short-pedicelled, 3″ long; style about as long as the stigmas.

Arctic America from Labrador to Alaska. Also in arctic and alpine Europe and Asia. Summer.

21. Salix cándida Fluegge. Hoary Willow. (Fig. 1193.)

Salix candida Fluegge; Willd. Sp. Pl. 4: 708. 1806.

An erect shrub, 2°–5° tall, the older twigs red or purple and terete, the younger densely white-tomentose. Leaves persistently white-tomentose beneath, green and loosely tomentose or becoming glabrate above when mature, oblong or oblong-lanceolate, thick, sparingly repand-denticulate or entire, acute at both ends or the lower obtuse at the apex, 2′–4′ long, 3″–8″ wide, their margins slightly revolute; petioles 1½″–2″ long; stipules lanceolate-subulate, about equalling the petioles, deciduous; aments expanding before the leaves, dense, cylindric, the staminate about 1′ long, the pistillate 1′–2′ long in fruit; bracts villous, persistent; stamens 2; filaments glabrous; style filiform, red, three times as long as the stigmas; capsule ovoid-conic, acute, densely tomentose, 2½″–3″ long, very short-pedicelled.

In bogs, Labrador and Hudson Bay to the Northwest Territory, south to New Jersey, western New York and Iowa. Hybridizes with *S. petiolaris* and *S. cordata*. May.

22. Salix viminàlis L. Osier Willow. (Fig. 1194.)

Salix viminalis L. Sp. Pl. 1021. 1753.

A small slender tree or shrub, with terete green twigs. Leaves elongated-lanceolate or linear-lanceolate, long-acuminate at the apex, sparingly repand-crenulate or entire, revolute-margined, short-petioled, dark green and glabrous above, persistently silvery-silky beneath, 3′-6′ long, 2″–8″ wide; stipules narrow, deciduous; aments expanding before the leaves, dense, the pistillate 2′–3′ long and nearly ½′ in diameter in fruit; stamens 2; filaments glabrous; style longer than the stigmas; capsule narrowly ovoid-conic, acute, silky-pubescent, about 3″ long, very short-pedicelled.

Cultivated for wicker-ware and occasionally escaped into wet places in the Eastern and Middle States. Native of Europe and Asia. April–May.

23. Salix phylicifòlia L. Tea-leaved Willow. (Fig. 1195.)

Salix phylicifolia L. Sp. Pl. 1016. 1753.

A shrub 1°–10° high, much branched, the twigs glabrous, dark purple-green, sometimes glaucous. Leaves oblong, lanceolate or elliptic, acute or obtuse at the apex, minutely repand-crenulate or entire, narrowed at the base, bright green and shining above, pale and glaucous beneath, 1½′–3′ long, ½′–1′ wide; petioles 3″–8″ long; stipules minute, fugacious, or wanting; ameuts sessile, sparingly leafy-bracted at the base, dense, oblong-cylindric, the staminate 1′ or less long, the pistillate 1′–2′ long in fruit; scales villous, persistent; stamens 2; filameuts glabrous; style rather longer than the stigmas; capsule conic, acute, pubescent or tomentose, 2½″ long, much longer than its pedicel.

Swamps, Labrador to Manitoba and the White Mountains of New Hampshire. Also in Europe. Summer.

24. Salix Bròwnii Bebb. Robert Brown's Willow. (Fig. 1196.)

Salix arctica R. Br. Ross' Voy. cxliv. 1819. Not Pall.
Salix Brownii Bebb, Coult. Bot. Gaz. 14: 115. 1889.

A low, much branched shrub, the twigs 4-angled, slender. Leaves oblong or lanceolate, glabrous or sometimes ciliolate, acute or the lower obtuse at the apex, entire or rarely with a few minute distant teeth, narrowed at the base, short-petioled, 1′–2′ long, 3″–8″ wide, remaining green in drying, the lower surface pale or glaucous, the margins not revolute; petioles only 1″–3″ long; stipules narrow, deciduous; aments borne on short leafy branches, the pistillate 1′–2½′ long in fruit; scales villous, persistent; obovate, obtuse, green or black-tipped; stamens 2; filaments glabrous; style filiform, much longer than the stigmas; capsule ovoid-conic, tomentose, short-pedicelled, acute, about 1½″ long.

Labrador to Alaska, south to Quebec, and in the Rocky Mountains to Colorado. Summer.

25. Salix àrctica Pall. Arctic Willow. Ground Willow. (Fig. 1197.)

Salix arctica Pall. Fl. Ross. 1: Part 2, 86. 1788.

A low branching shrub, the twigs terete or nearly so. Leaves glabrous, elliptic or broadly obovate, entire, obtuse and usually rounded at the apex, narrowed or rounded at the base, long-petioled, pale and glaucous beneath, 1′–2′ long, ½′–1½′ wide; petioles slender, ½′–1½′ long; aments borne at the ends of short leafy branches, very dense, the pistillate 1′–2′ long in fruit; scales dark purple, obovate, obtuse, densely white-villous, persistent; stamens 2; filaments glabrous; style filiform, longer than the stigmas; capsule conic, villous, very short-pedicelled.

Arctic America and Asia. Summer.

26. Salix cordàta Muhl. Heart-leaved Willow. (Fig. 1198.)

Salix cordata Muhl. Neue Schrift. Ges. Nat. Fr. Berlin, 4: 236. *pl. 6. f. 3.* 1803.

A shrub, 5°–12° high, the twigs puberulent or glabrous; young leaves pubescent. Mature leaves oblong-lanceolate, green on both sides or paler beneath, acuminate at the apex, narrowed, obtuse or subcordate at the base, sharply serrulate with glandular teeth, green in drying; stipules oblique, serrulate, usually large and persistent; petioles 4″–9″ long; aments bracted at the base, expanding before the leaves, the staminate about 1′ long, the pistillate 1½′–2½′ in fruit; scales silky, persistent; stamens 2; filaments glabrous; style short; capsules narrowly ovoid, acute, glabrous, 2″–3″ long, short-pedicelled.

In wet soil, New Brunswick to British Columbia, south to Virginia, Missouri, Colorado and California. Hybridizes with *S. sericea* and other species. April–May.

Salix cordàta angustàta (Pursh) Anders. Mon. Sal. 159. 1867.

Salix angustata Pursh, Fl. Am. Sept. 613. 1814.

Leaves narrower, linear-lanceolate. Range of the type.

Salix cordàta Mackenzieàna Hook. Fl. Bor. Am. 2: 149. 1839.

Small tree. Leaves lanceolate or oblanceolate. Manitoba and Northwest Territory to California.

27. Salix glaucophýlla Bebb. Broad-leaved Willow. (Fig. 1199.)

S. glaucophylla Bebb, in A. Gray, Man. Ed. 6, 485. 1889.

A shrub, 4°–10° high, foliage glabrous or when young sparingly pubescent. Mature leaves ovate, obovate or oblong-lanceolate, firm, dark green and shining above, white-glaucous beneath, short-acuminate, the base rounded or acute, serrulate with gland-tipped teeth, 2′–4′ long, ½′–2′ wide; stipules large, persistent; petioles stout, 3″–6″ long; aments expanding before the leaves, leafy-bracted at the base, the staminate 1′–2′ long, the pistillate 1½′–3′ long in fruit; scales densely white-villous, persistent; stamens 2; filaments glabrous; style filiform; capsule beaked from an ovoid base, acute, glabrous, 3″–5″ long, slender-pedicelled.

On sand dunes, Lake Michigan, northern Illinois and Wisconsin. Variable in leaf-form. April.

28. Salix Missouriénsis Bebb. Missouri Willow. (Fig. 1200.)

Salix cordata var. *vestita* Anders. Mon. Sal. 159. 1867.
Not *S. vestita* Pursh, 1814.

Salix Missouriensis Bebb, Gard. & For. 8: 373. 1895.

A tree, often 50° high, the trunk sometimes 1½° in diameter, the thin gray bark with small appressed scales. Twigs of the season pubescent or puberulent; leaves lanceolate, or oblanceolate, acuminate, finely serrate with minute gland-tipped teeth, rounded or narrowed at the base, pubescent when young, glabrous or nearly so when mature, green above, pale and usually glaucous beneath, 3′–6′ long, ½′–1½′ wide; petioles ½′ long or less; stipules often ½′ long, persistent or deciduous; aments narrowly cylindric, unfolding long before the leaves, the staminate about 1½′ long, the pistillate 3′–4′ long; scales persistent, villous; stamens 2; filaments glabrous; style very short; capsule narrowly ovoid, glabrous, 3–4 times as long as its pedicel.

On river banks, Missouri and Nebraska. Wood dark brown. March April.

29. Salix balsamífera (Hook.) Barratt. Balsam Willow. (Fig. 1201.)

Salix cordata var. *balsamifera* Hook. Fl. Bor. Am. 2: 149. 1839.

Salix balsamifera Barratt; Hook. Fl. Bor. Am. loc. cit. As synonym. 1839.

A shrub, 4°–10° high, the twigs glabrous, shining, the youngest foliage pubescent. Mature leaves elliptic, ovate-oval or obovate, thin, glabrous, acute or some of them obtuse at the apex, rounded or subcordate at the base, dark green above, glaucous and prominently reticulate-veined beneath, 2′–3′ long, 1′–1½′ wide, slightly crenulate-serrulate, the minute teeth glandular; stipules minute or none; petioles slender, 3″–6″ long; aments expanding with the leaves, leafy-bracted at the base, cylindric, the staminate dense, about 1′ long, the pistillate rather loose, 2′–3′ long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style almost none; capsules very narrow, acute, glabrous, 2″–2½″ long, slender-pedicelled.

In swamps, Labrador to Manitoba, south to Maine, Ontario and Minnesota. May.

30. Salix Bàrclayi Anders. Barclay's Willow. (Fig. 1202.)

S. Barclayi Anders. Ofv. Handl. Vet. Akad. 1858: 125. 1858.

A low shrub, with dark brown glabrous twigs, the young shoots pubescent. Leaves obovate, oval, or oval-lanceolate, short-pointed at the apex, serrulate, floccose-pubescent when young, when mature glabrous, bright green above, pale beneath, 1′–2′ long, ½′–1′ wide; petioles 1″–2″ long; stipules ovate, acute, deciduous; aments unfolding with the leaves, borne at the ends of short branches, dense, spreading or erect, the staminate 1′ long, the pistillate 2′–3′ long in fruit; scales persistent, slightly villous; stamens 2; filaments distinct; capsule narrowly conic, glabrous, acute, 3″ long; style longer than the stigmas.

Northwestern arctic America. Summer.

Salix Bàrclayi latiúscula Anders. in DC. Prodr. 16: Part 2, 255. 1868.

Leaves oval or obovate, subcordate at the base; stipules cordate. Newfoundland (according to Andersson).

31. Salix adenophýlla Hook. Furry Willow. (Fig. 1203.)

Salix adenophylla Hook. Fl. Bor. Am. 2: 146. 1839.

A straggling shrub, 3°–8° high, the twigs, petioles, stipules and leaves densely silky-tomentose, the silky hairs falling away from the leaves when old. Leaves ovate, acute or short-acuminate, or the lower obtuse at the apex, cordate or rounded at the base, finely serrulate with gland-tipped teeth, 1′–2′ long, 8″–1¼′ wide; petioles stout, 1½″–3″ long, dilated at the base; stipules ovate-cordate, obtuse, serrulate, persistent; aments leafy-bracted at the base, dense, expanding with the leaves, the staminate about 1′ long, the pistillate 1½′–4′ long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style filiform, longer than the stigmas; capsule sessile or very nearly so, ovoid-conic, acute, 1½″–2″ long.

On lake and river shores, Labrador to Ontario, Pennsylvania and Michigan. Hybridizes with *S. cordata*. April–May.

32. Salix myrtilloides L. Bog Willow. (Fig. 1204.)

Salix myrtilloides L. Sp. Pl. 1019. 1753.

An erect slender glabrous shrub, 1°–3° high, the twigs light brown, terete. Leaves oblong, elliptic or somewhat obovate, obtuse or acute at the apex, entire, mostly narrowed at the base, 1′–2½′ long, 4″–8″ wide, short-petioled, bright green above, pale or glaucous beneath, their margins slightly revolute; aments expanding with the leaves, leafy-bracted at the base, rather dense, 1′ or less long, or the pistillate longer in fruit; scales persistent, obtuse, slightly villous; stamens 2; filaments glabrous; style shorter than or equalling the stigmas; capsule oblong-conic, obtuse, glabrous, 2½″ long, 2–3 times as long as the filiform pedicel which slightly exceeds the scale.

In bogs, New Brunswick and Quebec to British Columbia, south to New Jersey and Iowa. Also in northern Europe. April–May.

Salix myrtilloides pedicellàris Anders. Mon. Sal. 96. 1867.
Leaves narrower, oblong-linear or oblanceolate; pedicels sometimes longer. Range of the type.

33. Salix Ùva-úrsi Pursh. Bearberry Willow. (Fig. 1205.)

Salix Uva-ursi Pursh, Fl. Am. Sept. 610. 1814.
Salix Cutleri Tuckerm. Am. Journ. Sci. 45: 36. 1843.

A depressed or prostrate glabrous shrub, the terete brown branches 6′–12′ long, diffuse from a deep central root. Leaves obovate or elliptic, obtuse or acute at the apex, narrowed at the base, crenulate-denticulate or entire, 4″–10″ long, 2″–5″ wide, prominently veined, deep green and shining above, pale beneath; petioles 1″–2″ long; aments leafy-bracted at the base, dense, about ½′ long in flower, the pistillate 1′–2′ long in fruit; scales persistent, obovate, obtuse, densely silky; stamens usually solitary, rarely 2; filaments glabrous; style short; capsule ovoid-conic, acute, glabrous, very short-pedicelled.

Labrador and Hudson Bay, south to the summits of the mountains of New York and New England. May–June.

34. Salix herbàcea L. Dwarf Willow. (Fig. 1206.)

Salix herbacea L. Sp. Pl. 1018. 1753.

A depressed matted shrub, with very slender angled twigs 1′–6′ long, the youngest foliage somewhat pubescent. Mature leaves glabrous, suborbicular, rounded or retuse at the apex, cordate or rounded at the base, thin, crenulate-denticulate all around, finely reticulate-veined, bright green and shining on both sides, 5″–10″ in diameter; petioles very slender, 2″–4″ long; aments terminating 2-leaved branchlets, 4–10-flowered, 2″–4″ long; scales obovate, obtuse, persistent, glabrous or nearly so; stamens 2; filaments glabrous; style rather longer than the 2-cleft stigmas; capsule narrowly conic, glabrous, nearly sessile.

Labrador and Quebec, through arctic America, and on the White Mountains of New Hampshire and Mt. Katahdin, Maine. Also in Europe and Asia. Summer.

Family 6. **BETULÀCEAE** Agardh, Aphor. 208. 1825.

Birch Family.

Monoecious or very rarely dioecious trees or shrubs, with alternate petioled simple leaves, and small flowers in linear-cylindric oblong or subglobose aments. Stipules mostly fugacious. Staminate aments pendulous. Staminate flowers 1–3 together in the axil of each bract, consisting of a membranous 2–4-parted calyx or none, and 2–10 stamens inserted on the receptacle, their filaments distinct, their anthers 2-celled, the anther-sacs sometimes distinct and borne on the forks of the 2-cleft filaments. Pistillate aments erect, spreading or drooping, spike-like or capitate. Pistillate flowers with or without a calyx adnate to the solitary 1–2-celled ovary; style 2-cleft or 2-divided; ovules 1–2 in each cavity of the ovary, anatropous, pendulous. Fruit a small compressed or ovoid-globose, mostly 1-celled and 1-seeded nut or samara. Testa membranous. Endosperm none. Cotyledons fleshy. Radicle short.

Six genera and about 75 species, mostly natives of the northern hemisphere.

Staminate flowers solitary in the axil of each bract, destitute of a calyx; pistillate flowers with a calyx.
Staminate flowers with no bractlets; pistillate aments spike-like; nut small, subtended by or enclosed in a large bractlet.
Fruiting bractlet flat, 3-cleft and incised. 1. *Carpinus.*
Fruiting bractlet bladder-like, closed, membranous. 2. *Ostrya.*
Staminate flowers with 2 bractlets; pistillate flowers 2–4, capitate; nut large, enclosed by a leafy involucre. 3. *Corylus.*
Staminate flowers 3–6 together in the axil of each bract, with a calyx; pistillate flowers without a calyx.
Stamens 2; filaments 2-cleft, each fork bearing an anther-sac; fruiting bracts 3-lobed or entire, deciduous, 4. *Betula.*
Stamens 4; anther-sacs adnate; fruiting bracts woody, erose or 5-toothed, persistent. 5. *Alnus.*

1. CARPÌNUS L. Sp. Pl. 998. 1753.

Trees or shrubs, with smooth gray bark, furrowed and ridged stems and straight-veined leaves, the primary veins terminating in the larger teeth. Aments expanding before the leaves. Staminate aments linear-cylindric, sessile at the ends of short lateral branches of the preceding season, their flowers solitary in the axil of each bract, consisting of 3–12 stamens; filaments short, 2-cleft, each fork bearing an anther-sac. Pistillate flowers in small terminal aments, 2 to each bract, consisting of a 2-celled ovary adnate to a calyx and subtended by a flat persistent bractlet, which becomes much enlarged, foliaceous and lobed or incised in fruit, the bracts deciduous; style slender or almost none; stigmas 2, subulate. Nut small, ovoid, acute, borne at the base of the large bractlet. [The ancient name.]

About 12 species, natives of the northern hemisphere, only the following American.

1. Carpinus Caroliniàna Walt. American Hornbeam. Blue Beech. Water Beech. (Fig. 1207.)

Carpinus Caroliniana Walt. Fl. Car. 236. 1788.

A small tree, with slender terete gray twigs, attaining a maximum height of about 40° and a trunk diameter of 2½°. Leaves ovate-oblong, acute or acuminate at the apex, sharply and doubly serrate all around, rounded or subcordate at the base, somewhat inequilateral, 2½′–4′ long, 1′–1½′ wide, green on both sides, glabrous above, slightly pubescent on the veins beneath, petioles very slender, 4″–7″ long; staminate aments 1′–1½′ long, their bracts triangular-ovate, acuminate, puberulent; anther-sacs villous at the summit; bractlet of the pistillate flowers 3-lobed at the base, firm-membranous, strongly veined and about 1′ long when mature, its middle lobe lanceolate, acute, 2–4 times as long as the lateral ones, incised-dentate on one side, often nearly entire on the other; nut somewhat compressed, 2″ long.

In moist woods and along streams, Nova Scotia to Ontario and Minnesota, south to Florida and Texas. Wood very hard and strong, durable, light brown; weight per cubic foot 45 lbs. April–May, the fruit ripe Aug.–Sept.

2. ÓSTRYA Scop. Fl. Carn. 414. 1760.

Trees similar to the Horubeams, the trunks furrowed, the primary veins of the leaves simple or forked, the aments expanding with or before the leaves. Staminate aments sessile at the ends of branchlets of the preceding season, their flowers as in *Carpinus*, solitary in the axil of each bract; filaments 2-cleft. Pistillate aments small, terminal, erect, the flowers 2 to each bract, subtended by a tubular, persistent bractlet which enlarges into a membranous, nerved, bladder-like sac in fruit. Style slender; stigmas 2, subulate. Nut ovoid-oblong, compressed, smooth, sessile in the base of the inflated sac. Mature pistillate ament hop-like. [The ancient name.]

Four species, the following, 1 in the Southwest, 1 in Europe and Asia, 1 Japanese.

1. Ostrya Virginiàna (Mill.) Willd. Hop-hornbeam. Iron-wood. (Fig. 1208.)

Carpinus Virginiana Mill Gard. Dict. Ed. 8. 1768.
Ostrya Virginica Willd. Sp. Pl. 4: 469. 1805.

A tree, with a maximum height of about 50°, trunk diameter of 2°, twigs of the season pubescent. Leaves ovate or oblong-ovate, the apex acuminate, the base rounded or inequilateral, sharply and doubly serrate, sparingly pubescent and green above, pubescent or tomentose beneath, 2½′–4′ long, 1′–1½′ wide; petioles rarely more than 2″ long; staminate aments 1½′–3′ long, their bracts triangular-ovate, acuminate; anther-sacs villous at the summit; bractlet of each fertile flower forming a sac 6″–8″ long and 4″–5″ in diameter in fruit, acute, cuspidate, pubescent, villous near and at the base with bristly hairs, parallel-veined and finely reticulated; nut 2½″ long, compressed, shining; ripe fertile aments erect or spreading, 1½′–2½′ long.

In dry woods, Cape Breton Island to Minnesota, Florida and Texas. Wood similar to that of the Hornbeam, but heavier; weight per cubic foot 51 lbs. April–May. Fruit ripe July–Aug.

3. CÓRYLUS L. Sp. Pl. 998. 1753.

Shrubs or small trees, with broad thin serrulate or incised leaves. Staminate aments sessile at the ends of twigs of the previous season, expanding much before the leaves, the flowers solitary in the axil of each bract, of about 4 stamens and 2 bractlets; filaments 2-cleft or 2-divided, each fork bearing an anther-sac, which is villous at the summit. Calyx none. Pistillate flowers from scaly buds, clustered at the ends of short branches of the season, each in the axil of a bract, consisting of an incompletely 2-celled ovary adnate to a calyx, a short style and 2 slender stigmas; bractlets 2, enlarged in fruit, forming a leaf-like involucre to the nut, remaining nearly distinct or united into a tubular beak. Nut ovoid or oblong, sometimes compressed, large, bony. [Name Greek, from the helmet-like involucre.]

Species 7, in the northern hemisphere. Besides the following, another occurs in California.

Involucre of 2 broad laciniate bractlets; leaves serrulate. 1. *C. Americana.*
Involucral bractlets united, prolonged into a tubular bristly beak. 2. *C. rostrata.*

1. Corylus Americàna Walt. Hazel-nut. (Fig. 1209.)

Corylus Americana Walt. Fl. Car. 236. 1788.

A shrub, 3°–8° tall, the young shoots russet-brown, densely hispid-pubescent with pinkish hairs, the twigs becoming glabrous. Leaves ovate or broadly oval, acute or acuminate at the apex, serrulate all around, cordate or obtuse at the base, glabrous or nearly so above, finely tomentose beneath, 3′–6′ long, 2′–4½′ wide; petioles 2″–4″ long; staminate aments mostly solitary, 3′–4′ long; involucre of the nut compressed, composed of the 2 nearly distinct finely pubescent leaf-like bractlets, which are laciniate on their margins, commonly broader than high and more or less exceeding the nut; nut compressed, light brown, striate, ½′ high.

In thickets, Maine and Ontario to Manitoba, Florida and Kansas. March–April. Nuts ripe July–Aug.

2. Corylus rostràta Ait. Beaked Hazelnut. (Fig. 1210.)

Corylus rostrata Ait. Hort. Kew. 3: 364. 1789.

A shrub, similar to the preceding species, but the foliage usually less pubescent. Leaves ovate or narrowly oval, acuminate at the apex, cordate or obtuse at the base, incised-serrate and serrulate, glabrous, or with some scattered appressed hairs above, sparingly pubescent at least on the veins beneath, 2½′–4′ long, 1′–2½′ wide; petioles 2″–4″ long; involucral bractlets bristly hairy, united to the summit and prolonged into a tubular beak about twice the length of the nut, laciniate at the summit; nut ovoid, scarcely compressed, striate, 5″–7″ high.

In thickets, Nova Scotia to British Columbia, south to Georgia, Tennessee, Kansas and Oregon. April–May. Fruit ripe Aug.–Sept.

4. BÉTULA L. Sp. Pl. 982. 1753.

Aromatic trees or shrubs, with dentate or serrate leaves, scaly buds and flowers of both kinds in aments expanding before or with the leaves, the pistillate erect or spreading. Staminate flowers about 3 together in the axil of each bract, consisting of a membranous, usually 4-toothed perianth, 2 stamens, and subtended by 2 bractlets; filaments short, deeply 2-cleft, each fork bearing an anther-sac. Pistillate flowers 2 or 3 (rarely 1) in the axil of each bract, the bracts 3-lobed, or sometimes entire, deciduous with the fruits; perianth none; ovary sessile, 2-celled; styles 2, stigmatic at the apex, mostly persistent. Nut small, compressed, membranous-winged on each side (a samara), shorter than the bracts. [The ancient name.]

About 35 species, natives of the north temperate and arctic zones.

* Trees.

Fruiting aments peduncled; bark chalky-white.
- Leaves deltoid, acuminate; lateral lobes of fruiting bracts short, divergent. 1. *B. populifolia.*
- Leaves ovate or suborbicular; lateral lobes of the fruiting bracts ascending. 2. *B. papyrifera.*

Fruiting aments peduncled; bark greenish-brown or brown.
- Western; leaves ovate, often obtuse at the base. 3. *B. occidentalis.*
- Eastern; leaves rhombic, acute at both ends. 4. *B. nigra.*

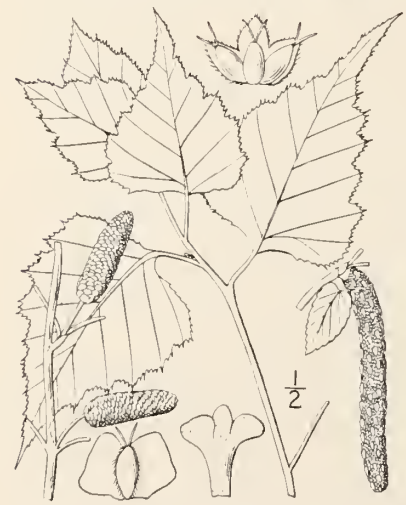
Fruiting aments sessile, at the ends of short branches; bark brown or yellowish.
- Fruiting bracts 2″ long, lobed at the apex; leaves shining above. 5. *B. lenta.*
- Fruiting bracts 4″ long, lobed to about the middle; leaves dull above. 6. *B. lutea.*

** Shrubs.

Twigs glandular-warty; leaves glabrous. 7. *B. glandulosa.*

Twigs not glandular-warty, glabrous or pubescent.
- Leaves glabrous; upper fruiting bracts mostly entire. 8. *B. nana.*
- Young foliage densely pubescent; bracts 3-lobed. 9. *B. pumila.*

1. Betula populifòlia Marsh. American White Birch. (Fig. 1211.)



Betula populifolia Marsh. Arb. Am. 19. 1785.
B. alba var. *populifolia* Spach, Ann. Sci. Nat. (II.) 15: 187. 1841.

A slender tree with very white smooth bark, tardily separating in thin sheets; maximum height 45°; trunk diameter 1½°; the twigs russet, warty. Leaves deltoid, pubescent on the veins when young, nearly glabrous when old, minutely glandular, dark green above, light green beneath, long-acuminate, sharply dentate and commonly somewhat lobed, obtuse or truncate at the base, 1½′–2½′ long, 1′–2′ wide, slender-petioled; petioles channeled; staminate aments 2′–3′ long; pistillate aments cylindric, in fruit 9″–18″ long, 3″–5″ in diameter, slender-peduncled; fruiting bracts puberulent, 1″–2″ long, their lateral lobes divergent, larger than the middle one; nut narrower than its wings.

In moist or dry soil, New Brunswick to southern Ontario, Pennsylvania and Delaware. Wood soft, weak, light brown; weight per cubic foot 36 lbs. Leaves tremulous like those of the Aspens. May.

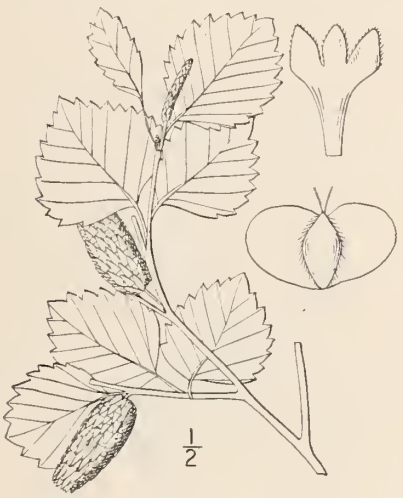
2. Betula papyrifera Marsh. Paper or Canoe Birch. (Fig. 1212.)

Betula papyrifera Marsh. Arb. Am. 19. 1785.
Betula papyracea Ait. Hort. Kew. 3: 337. 1789.

A large forest tree with maximum height of about 80° and trunk diameter of 3°. Bark, except of the young wood, peeling in thin layers. Leaves ovate, acute or acuminate, dentate and denticulate, subcordate, truncate or obtuse at the base, dark green and glabrous above, glandular and pubescent on the veins beneath, slender-petioled, 1½′–4½′ long, 1′–3′ wide; petioles ½′–1½′ long; staminate aments 2′–4′ long; pistillate aments cylindric, slender-peduncled, 1′–2′ long, ¼′–½′ in diameter in fruit, spreading or somewhat drooping; fruiting bracts 2″–3″ long, puberulent or ciliate; nut narrower than its wings.

Newfoundland to Alaska, northern Pennsylvania, Michigan and Washington. Wood hard, strong, reddish-brown; weight per cubic foot 37 lbs. The chalky-white outer bark interesting to tourists. April–May.

Betula papyrifera minor Tuckerm. Am. Journ. Sci. 45: 31. 1843. This is a low bushy form, occurring on the higher mountains of New England and northern New York.



3. Betula occidentàlis Hook. Western Red Birch. (Fig. 1213.)

Betula occidentalis Hook. Fl. Bor. Am. 2: 155. 1839.

A tree, attaining a maximum height of about 40° and a trunk diameter of 1½°, the bark smooth, dark bronze, the twigs gray-brown, warty. Leaves broadly ovate or nearly orbicular, acute or obtuse at the apex, sharply serrate, rounded or obtuse at the base, short-petioled, glabrous on both sides or sparingly pubescent on the veins beneath, 1′–2′ long; petioles slender, 2″–6″ long; pistillate aments manifestly peduncled, cylindric, spreading or pendant, 1′–1¼′ long, about 5″ in diameter in fruit; fruiting bracts ciliolate, about 3″ long, their lateral lobes ascending, usually shorter than the middle one; nut much narrower than its wings.

Western Nebraska to British Columbia, California and New Mexico. Wood soft, strong, brittle, light brown; weight per cubic foot 38 lbs. April–May.

4. Betula nìgra L. River Birch. Red Birch. (Fig. 1214.)

Betula nigra L. Sp. Pl. 982. 1753.

A slender tree, sometimes 90° high and the trunk 2½° in diameter; bark reddish or greenish-brown, peeling in very thin layers; twigs reddish. Young shoots, petioles and lower surfaces of the leaves tomentose; leaves rhombic-ovate, apex acute or obtuse, irregularly serrate or somewhat lobed, base cuneate, when mature dark green and glabrous above, pale and glabrous or somewhat tomentose beneath, 1½′–3′ long; petioles 3″–8″ long; staminate aments mostly clustered in 2's or 3's, 2½′–3½′ long; pistillate aments oblong-cylindric, spreading, peduncled, 1′–2′ long, 5″–6″ in diameter in fruit; fruiting bracts tomentose, about equally 3-lobed, 3″–5″ long; nut broadly obovate, wider than its wings, pubescent at the base.

Along streams and lakes, Massachusetts to Iowa and Kansas, south to Florida and Texas. Wood hard, strong, brown; weight per cubic foot 36 lbs. The bark of the branches peels off in almost membranous layers. April–May.

5. Betula lénta L. Cherry, Black or Sweet Birch. (Fig. 1215.)

Betula lenta L. Sp. Pl. 983. 1753.

A large forest tree, sometimes 80° high, with dark brown close smooth bark, becoming furrowed, not separating in layers; foliage aromatic; twigs smooth, warty, young leaves silky. Mature leaves ovate or ovate-oblong, acute or acuminate, the base cordate or rounded, sharply serrulate, bright green, and shining above, dull green and pubescent on the veins beneath, 2½′–4′ long, 1′–2′ wide; petioles 3″–6″ long; staminate aments clustered, 2½′–4′ long; pistillate aments sessile, dense, oblong, about 1′ long and ½′ in diameter in fruit, nearly erect; bracts glabrous or minutely puberulent, appressed, about 2″ long, nearly equally 3-lobed, the lateral lobes somewhat divergent; nut oblong, broader than its wings.

Newfoundland to western Ontario, Florida and Tennessee. Wood hard, strong, dark brown; weight per cubit foot 47 lbs. The aromatic oil of the branches and foliage (same as oil of wintergreen) is distilled in quantities and is an important article of commerce. Tree much resembles the cherry. April–May.

6. Betula lùtea Michx. f. Yellow Birch. Gray Birch. (Fig. 1216.)

Betula lutea Michx. f. Arb. Am. 2: 152. *pl. 5.* 1812.

A large forest tree, similar to the preceding species, reaching a maximum height of about 100° and a trunk diameter of 4°, the bark yellowish or gray, separating in thin layers or close, the twigs gray-brown. Leaves ovate or oblong-ovate, mostly acuminate at the apex, rounded, obtuse or rarely subcordate at the base, sharply serrulate all around, dark green and dull above, pubescent on the veins beneath, 1½′–4′ long, petioles 4″–9″ long; staminate aments usually 2–4 together; pistillate aments sessile, oblong or oblong-cylindric, 1½′ or less long, 7″–9″ thick in fruit, rather loose; bracts nearly equally 3-lobed to the middle, ciliolate, the lateral lobes ascending; nut broadly oblong, wider than its wings.

Newfoundland to Manitoba, south to North Carolina and Tennessee, mainly in the Alleghanies. Wood hard, strong, light brown; weight per cubic foot 41 lbs. April–May.

7. Betula glandulòsa Michx. Glandular or Scrub Birch. (Fig. 1217.)

Betula glandulosa Michx. Fl. Bor. Am. 2: 180. 1803.

A shrub, 1°–4° high, the twigs brown, glandular-warty, not pubescent. Leaves orbicular, oval or obovate, glabrous, rounded at the apex; rounded, narrowed or cuneate at the base, crenate-dentate, bright green above, pale green and glandular-dotted beneath, short-petioled, ¼′–1′ long; petioles 1″–3″ long; staminate aments commonly solitary, about ½′ long; pistillate aments cylindric, erect, peduncled, 5″–12″ long and about 2″ in diameter in fruit; fruiting bracts glabrous, the lateral lobes divergent, rather shorter than the middle one; nut oblong, usually narrower than its wings.

Newfoundland to Alaska, the higher mountains of Maine and northern New York, Michigan, Minnesota and in the Rocky Mountains to Colorado. Also in Asia. June–July.

8. Betula nàna L. Dwarf Birch. (Fig. 1218.)

Betula nana L. Sp. Pl. 983. 1753.
B. Michauxii Spach, Ann. Sci. Nat. (II.) 15: 195. 1841.

A low diffuse shrub, similar to the preceding species, but the twigs glandless, puberulent or glabrous. Leaves orbicular, obovate, or reniform and wider than long, bright green, firm, glabrous, on both sides when mature, deeply and incisely crenulate, rounded at the apex, rounded, obtuse or cuneate at the base, 3″–10″ long; petioles rarely more than 1″ long; staminate aments ½′–1′ long, solitary or clustered; pistillate aments oblong, sessile or short-peduncled, erect or somewhat spreading, 3″–5″ long; fruiting bracts glabrous, the lower usually 3-lobed, the upper ovate or lanceolate, mostly entire; nut oblong, wingless or narrowly winged.

Greenland and Labrador to Hudson Bay. Also in northern Europe and Asia. May–June.

9. Betula pùmila L. Low Birch. (Fig. 1219.)

Betula pumila L. Mant. 124. 1767.

A bog shrub, 2°–15° tall, the twigs brown, becoming glabrous, the young foliage densely brownish-tomentose. Leaves obovate, broadly oval or orbicular, rounded at both ends or some of them cuneate-narrowed at the base, rather coarsely dentate, when mature glabrous and dull green above, pale, persistently tomentose or becoming glabrous beneath and prominently reticulate-veined, ½′–1½′ long; petioles 1½″–3″ long; fruiting pistillate aments oblong-cylindric, erect, peduncled, 1′ long or less, about 3″ in diameter; bracts puberulent or ciliolate, the lateral lobes spreading at right angles, shorter than the middle one; nut oblong, mostly rather broader than its wings.

In bogs, Newfoundland to western Ontario and the Northwest Territory, south to New Jersey, Ohio and Minnesota. May–June.

5. ÁLNUS Gaertn. Fr. & Sem. 2: 54. *pl. 90.* 1791.

Shrubs or trees, with dentate or serrulate leaves, few-scaled buds, and flowers of both kinds in aments, expanding before, with or after the leaves, making their first appearance during the preceding season, the staminate pendulous, the pistillate erect, clustered. Staminate flowers 3 or sometimes 6 in the axil of each bract, consisting of a mostly 4-parted perianth, 4 stamens and subtended by 1 or 2 bractlets; filaments short, simple; anther-sacs adnate. Pistillate flowers 2–3 in the axil of each bract, without a perianth, but subtended by 2–4 minute bractlets; ovary sessile, 2-celled; styles 2; bracts woody, persistent, 5-toothed or erose. Nut small, compressed, wingless or winged. [Ancient Latin name derived from the Celtic, in allusion to the growth of these trees along streams.]

About 14 species, natives of the northern hemisphere and the Andes of South America. Besides the following, some 4 others occur in the western parts of North America.

Nut bordered by a membranous wing on each side. 1. *A. Alnobetula.*
Nut acute-margined, wingless.
  Leaves obovate, broadly oval or suborbicular, dull; aments expanding long before the leaves.
    Leaves finely tomentose or glaucous beneath. 2. *A. incana.*
    Leaves green, glabrous or sparingly pubescent beneath.
      Leaves finely serrulate; foliage not glutinous; native. 3. *A. rugosa.*
      Leaves dentate-serrate; twigs glutinous; introduced tree. 4. *A. glutinosa.*
  Leaves oblong, bright green and shining above; aments expanding in autumn. 5. *A. maritima.*

1. Alnus Alnobétula (Ehrh.) K. Koch. Green or Mountain Alder. (Fig. 1220.)

Betula Alnobetula Ehrh. Beitr. 2: 72. 1788.
Betula viridis Chaix; Vill. Hist. Pl. Dauph. 3: 789. 1789.
Alnus viridis DC. Fl. Fr. 3: 304. 1805.
Alnus Alnobetula K. Koch, Dendr. 2: Part 1, 625. 1872.

A shrub, 2°–10° high, the young foliage glutinous and more or less pubescent. Leaves oval or ovate, obtuse or acute, sharply and more or less irregularly serrulate or incised-serrulate, when mature dark green and glabrous above, light-green and usually pubescent on the veins beneath, 2′–5′ long, 1½′–3′ wide; petioles 4″–12″ long; aments expanding with the leaves, the staminate slender, naked, 1½′–2½′ long, the pistillate from scaly buds, oblong or ovoid-oblong, slender-peduncled, becoming 6″–8″ long and 4″–5″ in diameter in fruit, their bracts irregularly 5-toothed; nut oblong, the thin wings about as broad as the body.

Newfoundland to Alaska, Massachusetts, New York, Michigan and British Columbia, and in the higher Alleghanies of Virginia and North Carolina. Also in Europe and Asia. June.

2. Alnus incàna (L.) Willd. Speckled or Hoary Alder. (Fig. 1221.)

Betula Alnus var. *incana* L. Sp. Pl. Ed. 2, 1394. 1763.
Alnus incana Willd. Sp. Pl. 4: 335. 1805.

A shrub, or rarely a small tree, 8°–25° high, the twigs glabrous, the young shoots pubescent. Leaves oval or ovate, acute or sometimes obtuse at the apex, finely serrulate or dentate, with the teeth serrulate, obtuse or some of them acute at the base, dark green above, pale or glaucous and pubescent, at least on the veins beneath, 2′–5′ long, 1½′–4′ wide, the veins prominent on the lower surface; stipules oblong-lanceolate, deciduous; petioles 4″–12″ long; aments appearing from naked buds, unfolding much before the leaves, the staminate 1½′–3′ long, the pistillate ovoid, about ½′ long and 3″–5″ in diameter in fruit, their bracts 5-toothed; nut orbicular, coriaceous-margined.

In wet soil, Newfoundland to the Northwest Territory, south to southern New York, Pennsylvania and Nebraska. Also in Europe and Asia. Wood soft, light brown; weight per cubic foot 28 lbs. April–May.

3. Alnus rugòsa (DuRoi) K. Koch. Smooth Alder. (Fig. 1222.)

Betula Alnus rugosa DuRoi, Harbk. 1: 112. 1771.
Alnus serrulata Willd. Sp. Pl. 4: 336. 1805.
Alnus rugosa K. Koch, Dendr. 2: Part 1, 635. 1872.

A shrub 5°–20° tall, or sometimes a small tree, attaining a maximum height of 40° and a trunk diameter of 6′, the bark smooth, the younger shoots somewhat pubescent. Leaves green on both sides, obovate or oval, mostly obtuse and rounded at the apex, narrowed or rounded at the base, sharply and minutely serrulate, when mature glabrous above, usually pubescent on the veins beneath, 3′–5′ long, stipules oval, deciduous; petioles 4″–12″ long; aments appearing from naked buds, unfolding much before the leaves (or in the South after the leaves), the staminate 2′–4′ long, the pistillate ovoid, 6″–9″ long in fruit; nut ovate, narrowly coriaceous-margined.

In wet soil, or on hillsides, Maine to Ohio and Minnesota, Florida and Texas. Wood soft, light brown; weight per cubic foot 29 lbs. March–April.

4. Alnus glutinòsa (L.) Medic. European Alder. (Fig. 1223.)

Betula Alnus var. *glutinosa* L. Sp. Pl. 983. 1753. *Alnus glutinosa* Medic. Pfl. Anat. 393. 1800.

A tree, reaching a maximum height of about 75° and a trunk diameter of 2½°, the bark smooth, the branches nearly horizontal, the foliage glutinous. Leaves broadly oval, orbicular or obovate, thick, dark green, dull, often obtuse at both ends, dentate and the teeth denticulate, glabrous above, pubescent on the veins beneath, 2′–5′ long; petioles ½′–1′ long; aments appearing from naked buds, expanding much before the leaves, the staminate 3′–4′ long, the pistillate ovoid-oblong, 6″–9″ long in fruit; nut wingless, coriaceous-margined.

In wet places, southern New York and New Jersey, escaped from cultivation and becoming naturalized in a few localities. Native of Europe. Wood soft, brown; weight per cubic foot 35 lbs. April.

5. Alnus marítima (Marsh.) Muhl. Seaside Alder. (Fig. 1224.)

Betula Alnus maritima Marsh. Arb. Am. 20. 1785. *Alnus maritima* Muhl.; Nutt. Sylva, 1: 34. *t.* 102. 1865.

A small tree, sometimes 30° tall and the trunk 6′ in diameter, glabrous or very nearly so throughout. Leaves oblong, ovate-oblong or obovate, firm, acute at both ends, bright green and shining above, pale green and dull beneath, sharply serrulate, 2′–4′ long, 1′–2′ wide; petioles 3″–10″ long; aments unfolding long after the leaves, their buds developing during the season, the staminate 1′–2½′ long, the pistillate oblong, 9″–12″ long, 5″–7″ in diameter in fruit; nut oblong-obovate, wingless, coriaceous-margined.

In wet soil, southern Delaware and eastern Maryland; also in the Indian Territory. Closely related to *A. Japonica* of northeastern Asia, and perhaps not specifically distinct from it. Wood soft, light brown; weight per cubic foot 31 lbs. Aug.–Sept.

Family 7. **FAGÀCEAE** Drude, Phan. 409. 1879.

BEECH FAMILY.

Trees or shrubs. Leaves alternate, petioled, simple, dentate, serrate, lobed, cleft or entire, pinnately veined, the stipules, if any, deciduous. Flowers small, monoecious, the staminate in pendulous erect or spreading aments, or capitate, the pistillate solitary or several together, subtended by an involucre of partly or wholly united bracts, which becomes a bur or cup. Petals none. Staminate flowers with a 4–7-lobed perianth and 4–20 stamens; filaments slender, distinct, simple; anther-sacs adnate, longitudinally dehiscent. Pistillate flowers with a 4–8-lobed urn-shaped or oblong perianth, adnate to the 3–7-celled ovary; ovules 1–2 in each cavity, only 1 in each ovary ripening, pendulous, anatropous; styles as many as the cavities of the ovary, linear, terminally or longitudinally stigmatic. Fruit a 1-seeded nut, with a coriaceous or somewhat bony exocarp. Testa thin. Endosperm none; cotyledons large, fleshy, often rugose; radicle short.

About 5 genera and 375 species, of very wide geographic distribution.

Staminate flowers capitate; nut sharply triangular. 1. *Fagus.*

Staminate flowers in slender aments; nut rounded or plano-convex.

Pistillate flowers 2–5 in each involucre; involucre becoming globose and very prickly in fruit, enclosing the nuts. 2. *Castanea.*

Pistillate flower 1 in each involucre; involucre of numerous scales forming a cup in fruit and subtending the acorn. 3. *Quercus.*

1. FÀGUS L. Sp. Pl. 997. 1753.

Trees, with smooth light gray bark, and serrate straight-veined leaves. Flowers appearing with the leaves, the staminate in slender-peduncled pendulous globose heads, the pistillate about 2 together in short-peduncled subulate-bracted involucres in the upper axils. Staminate flowers yellowish-green, subtended by deciduous bracts, consisting of a campanulate 4–8-lobed calyx, and 8–16 stamens with filiform filaments. Pistillate flowers with a 6-lobed perianth adnate to a 3-celled ovary; ovules 2 in each cavity, usually 1 only of each ovary maturing; styles 3, filiform. Nut coriaceous, sharply 3-angled, enclosed in the 4-valved bur. [Name from the Greek, to eat, referring to the esculent nuts.]

About 4 species, natives of the northern hemisphere. Only the following is native in North America.

1. Fagus Americàna Sweet. American Beech. (Fig. 1225.)

Fagus Americana [*latifolia*] Muench. Hausv. 5: 162. 1770.
Fagus Americana Sweet, Hort. Brit. 370. 1826.
Fagus ferruginea Ait. Hort. Kew. 3: 362. 1789.

A large forest tree, with maximum height of about 120°, and a trunk diameter of 4½°, the lower branches spreading. Leaves ovate or ovate-oblong, firm, acuminate at the apex, obtuse or narrowed at the base, 2′–4½′ long, 1′–3′ wide, densely silky when young, glabrous or nearly so when mature, green on both sides, not shining, rather coarsely serrate; petioles 2″–6″ long; heads of staminate flowers 6″–9″ in diameter, hanging on peduncles 1′–3′ long; bur 6″–10″ high, densely tomentose, its soft prickles recurved or spreading; nut pubescent, or at length nearly glabrous, brown; seed sweet.

In rich soil, Nova Scotia to Ontario and Wisconsin, south to Florida and Texas. Wood hard, strong, tough, close-grained; color light or dark red; weight 43 lbs. per cubic foot. April–May. Nuts ripe Sept.–Oct. Leaves of seedlings and young shoots are sometimes pinnatifid.

2. CASTÀNEA Adans. Fam. Pl. 2: 375. 1763.

Trees or shrubs, with serrate straight-veined leaves, their teeth sharply acuminate. Flowers appearing after the leaves, the staminate in erect or spreading narrowly cylindric interrupted axillary yellowish aments, several in the axil of each bract, the bracts fugacious, the pistillate borne in prickly involucres at the bases of the staminate aments or in separate axils. Staminate flowers 2-bracteolate, consisting of a mostly 6-lobed campanulate perianth and numerous stamens, sometimes also with an abortive ovary; filaments filiform, long-exserted. Pistillate flowers 2–5 (commonly 3) in each involucre, consisting of an urn-shaped 6-lobed perianth adnate to the mostly 6-celled ovary, and usually with 4–12 abortive stamens; ovules 2 in each cavity, 1 ovule only of each ovary usually maturing; styles as many as the cavities of the ovary, slender, exserted; stigmas minute. Pistillate involucre enlarging and becoming a globose mostly 4-valved very prickly bur in fruit, enclosing 1–several nuts. Nut rounded or plano-convex, 1-seeded, the shell coriaceous. Seed large, sweet. Style mostly persistent. [Name Greek, from a city in Thessaly.]

Four or five species, natives of the northern hemisphere. Besides the following, another occurs in the southeastern United States.

Leaves green on both sides; nuts usually 2–5 in each involucre; large tree. 1. *C. dentata.*
Leaves densely white-tomentose beneath; nut usually solitary; shrub or small tree. 2. *C. pumila.*

1. **Castanea dentàta** (Marsh.) Borkh. American Chestnut. (Fig. 1226.)

Fagus Castanea dentata Marsh. Arb. Am. 46. 1785.
Castanea dentata Borkh. Handb. Forstb. 1: 741. 1800.
C. vesca var. *Americana* Michx. Fl. Bor. Am. 2: 193. 1803.

A large forest tree, with gray bark rough in longitudinal plates, reaching a maximum height of about 100° and a trunk diameter of 14°; lower branches spreading. Leaves oblong-lanceolate, glabrous, firm, acuminate at the apex, narrowed or rounded at the base, coarsely serrate, with very sharp-pointed ascending teeth, rather dark green above, lighter beneath, 5′–12′ long, 1½′–3′ wide; petioles stout, ½′–1′ long; staminate aments erect, numerous, borne solitary in the upper axils, 6′–12′ long, 4″–5″ in diameter; burs 1½′–4′ in diameter, solitary or 2–4 together, enclosing 1–5 nuts; nuts puberulent, dark brown, plano-convex or angled on the face, or when solitary ovoid.

In rich soil, Maine and Ontario to Michigan and Tennessee. Wood coarse-grained, durable, brown; weight per cubic foot 28 lbs. Involucre sometimes suppressed and the nuts naked. June–July. Nuts ripe Sept.–Oct.

2. **Castanea pùmila** (L.) Mill. Chinquapin. (Fig. 1227.)

Fagus pumila L. Sp. Pl. 998. 1753.
Castanea pumila Mill. Gard. Dict. Ed. 8, no. 2. 1768.

A shrub or small tree, sometimes 45° high and with a trunk 3° in diameter, the young shoots puberulent. Leaves oblong, acute at both ends, sharply serrate with ascending or divergent teeth, dark green and glabrous above, densely white-tomentulose beneath, 3′–6′ long, 1′–2½′ wide; staminate aments erect or somewhat spreading, 3′–5′ long, 3″–4″ in diameter; burs 1½′ in diameter or less, commonly spicate, enclosing a solitary ovoid brown nut (rarely 2); seed very sweet.

In dry soil, New Jersey and Pennsylvania to Indiana, Florida and Texas. Wood strong, coarse-grained, dark brown; weight per cubic foot 37 lbs. June. Nuts ripe Sept.

3. **QUÉRCUS** L. Sp. Pl. 994. 1753.

Trees or shrubs, with pinnatifid lobed dentate crenate or entire leaves, deciduous or in some species persistent. Flowers very small, green or yellowish, appearing with or before the leaves, the staminate numerous in slender mostly drooping aments, the pistillate solitary in many-bracted involucres borne on the twigs of the preceding season or on the young shoots. Staminate flowers subtended by caducous bracts, consisting of a mostly 6-lobed campanulate perianth and 6–12 stamens with filiform filaments, sometimes also with an abortive pilose ovary. Pistillate flowers with an urn-shaped or oblong calyx, adnate to a mostly 3-celled ovary; ovules 2 in each cavity of the ovary, rarely more than 1 in each ovary maturing; styles as many as the ovary-cavities, short, erect or recurved. Fruit consisting of the imbricated and more or less united bracts of the involucre (cup), subtending or nearly enclosing the ovoid, oblong or subglobose 1-seeded coriaceous nut (acorn). [The ancient Latin name, probably of Celtic derivation, signifying "beautiful tree."]

About 200 species, natives of the northern hemisphere. Besides the following, some 30 others occur in the western and southern sections of North America.

* *Leaves or their lobes bristle-tipped, deciduous; acorns maturing in autumn of second year.*

† Leaves pinnatifid or pinnately lobed.

Leaves green on both sides.
- Cup of the acorn saucer-shaped, much broader than high.
  - Cup 8″–12″ broad; acorn ovoid; leaves dull. — 1. *Q. rubra.*
  - Cup 4″–8″ broad; leaves shining.
    - Acorn subglobose or short-ovoid; northern. — 2. *Q. palustris.*
    - Acorn ovoid; southern. — 3. *Q. Texana.*
- Cup of the acorn turbinate or hemispheric.
  - Inner bark gray; leaves shining both sides. — 4. *Q. coccinea.*
  - Inner bark orange; leaves pubescent in the axils of the veins beneath. — 5. *Q. velutina.*

Leaves white or gray-tomentulose beneath.
- Large tree; leaf-lobes lanceolate or linear-lanceolate, long. — 6. *Q. digitata.*
- Shrub or low tree; leaf-lobes triangular-ovate, short. — 7. *Q. nana.*

†† Leaves 3-5-lobed above the middle or entire, obovate or spatulate in outline.

Leaves obovate-cuneate, brown-floccose beneath. 8. *Q. Marylandica.*
Leaves spatulate, glabrous both sides. 9. *Q. nigra.*

††† Leaves entire, oblong, lanceolate or linear-oblong (sometimes lobed in no. 11).

Leaves linear-oblong, green and glabrous on both sides. 10. *Q. Phellos.*
Leaves oblong, glabrous, dark green and shining above. 11. *Q. laurifolia.*
Leaves oblong or lanceolate, brown-tomentulose beneath. 12. *Q. imbricaria.*

** *Leaves or their lobes not bristle-tipped, deciduous; acorns maturing in autumn of first year.*

† Leaves pinnatifid or pinnately lobed.

Mature leaves pale, or glaucous and glabrous beneath; cup shallow. 13. *Q. alba.*
Mature leaves tomentulose beneath; cup one-third to fully as long as the acorn.
Upper scales of the cup not awned.
Leaves yellowish-brown-tomentulose beneath; acorn ovoid. 14. *Q. minor.*
Leaves white-tomentulose beneath; acorn depressed-globose. 15. *Q. lyrata.*
Upper scales awned, forming a fringe around the acorn. 16. *Q. macrocarpa.*

†† Leaves crenate or dentate, not lobed.

Fruit peduncled.
Peduncle much longer than petioles; leaves white-tomentulose beneath. 17. *Q. platanoides.*
Peduncle equalling or shorter than the petioles; leaves gray-tomentulose beneath.
Teeth of the leaves acute or mucronulate. 18. *Q. Michauxii.*
Teeth of the leaves rounded. 19. *Q. Prinus.*
Fruit sessile.
Tall tree; leaves oblong or lanceolate. 20. *Q. acuminata.*
Shrub or low tree; leaves oval or obovate. 21. *Q. prinoides.*
*** *Leaves entire (rarely with a few bristle-tipped lobes), evergreen.* 22. *Q. Virginiana.*

1. Quercus rùbra L. Red Oak. (Fig. 1228.)

Quercus rubra L. Sp. Pl. 996. 1753.
Q. ambigua Michx. f. Hist. Arb. Am. 2: 120. *pl. 24.* 1812.

A large forest tree, with a maximum height of about 140°, and a trunk diameter of 7°, the bark dark gray, slightly roughened. Leaves oval or somewhat obovate in outline, deciduous, when mature glabrous, or pubescent in the axils of the veins beneath, 4′–8′ long, 3′–6′ wide, dull green above, paler beneath, sinuses rounded, lobes triangular-lanceolate, tapering from a broad base to an acuminate apex, 1–4-toothed or entire, teeth and apices tipped with filiform bristles; petioles 1½′–3′ long; styles slender, spreading; fruit maturing the second autumn; cup saucer-shaped, its base flat or slightly convex, 8″–12″ broad, bracts ovate or ovate-lanceolate, obtuse or the upper acute, appressed; acorn ovoid, about 1′ long, 2–4 times as long as the cup.

Nova Scotia to Ontario and Minnesota, south to Florida, Kansas and Texas. Wood hard, strong, coarse-grained; color light reddish-brown; weight per cubic foot 41 lbs. May–June. Acorns ripe Oct.–Nov.

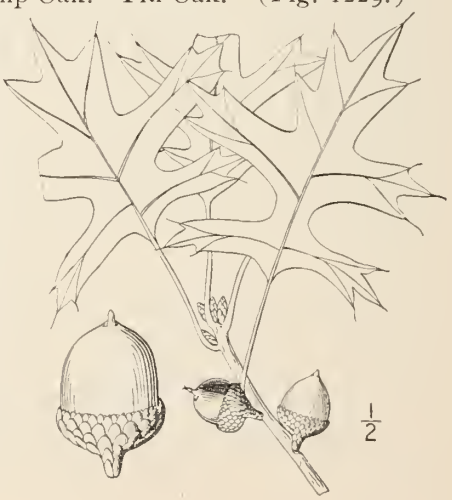
Quercus rùbra runcinàta A. DC. Prodr. 16: Part 2, 60. 1864.
Leaf-lobes nearly entire; acorn ½′ high. Near St. Louis. Perhaps a hybrid with *Q. digitata.*

2. Quercus palústris DuRoi. Swamp Oak. Pin Oak. (Fig. 1229.)

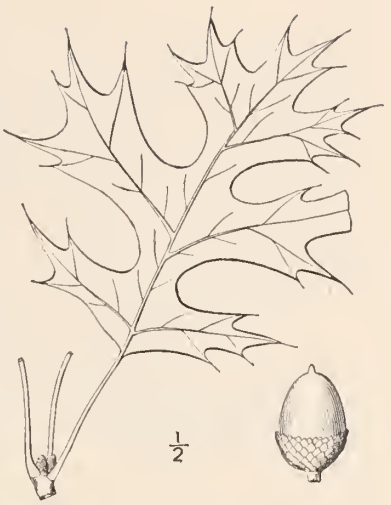
Q. palustris DuRoi, Harbk. 2: 268. *pl. 5. f. 4.* 1772.

A forest tree, maximum height about 120° and trunk diameter 5°, the lower branches deflexed; bark brown, rough when old. Leaves broadly oblong or obovate in outline, deeply pinnatifid, sometimes almost to the midrib, bright green glabrous and shining above, duller, glabrous or with tufts of hairs in the axils of the veins beneath, 3′–5′ long, the lobes oblong, lanceolate or triangular-lanceolate, divergent, 1–4-toothed or entire, teeth and apices tipped with filiform bristles; styles slender; fruit maturing in the second autumn; cup saucer-shaped, 4″–6″ broad, base flat, bracts triangular-ovate, acute or obtuse, appressed; acorn subglobose or ovoid, 4″–7″ high, often striate, 2–3 times as long as the cup.

In moist ground, Massachusetts to Wisconsin, Delaware and Arkansas. Wood hard, very strong, coarse-grained; color light brown; weight per cubic foot 43 lbs. May–June. Acorns ripe Sept.–Oct.



3. Quercus Texàna Buckley. Texan Red Oak. (Fig. 1230.)



Q. Texana Buckley, Proc. Phila. Acad. 1860: 444. 1860.

A forest tree, similar to the preceding species and to *Q. rubra*, attaining a maximum height of about 200° and a trunk diameter of 8°, usually smaller. Bark reddish-brown, with broad ridges broken into plates; leaves mostly obovate in outline, bright green and shining above, paler and with tufts of wool in the axils beneath, 2′–6′ long, truncate or broadly wedge-shaped at the base, deeply pinnatifid into 5–9 oblong or triangular lobes, which are entire or coarsely few toothed, the lobes and teeth bristle-tipped; styles short; fruit maturing in the autumn of the second season; cup deeply saucer-shaped, 5″–8″ broad, its scales obtusish or acute, appressed; acorn ovoid, ½′–1′ long, 2–3 times as high as the cup.

Southern Indiana to Iowa and Missouri, Florida and Texas. Wood hard, light red-brown; weight per cubic foot 57 lbs. April–May. Acorns ripe Sept.–Oct.

4. Quercus coccínea Wang. Scarlet Oak. (Fig. 1231.)

Quercus coccinea Wang. Amer. 44. *pl. 4. f. 9.* 1787.

A forest tree, attaining a maximum height of about 160°, the trunk diameter sometimes 5°; inner bark pale reddish or gray; foliage turning scarlet in autumn. Leaves deeply pinnatifid, glabrous, bright green and shining above, paler and sometimes pubescent in the axils of the veins beneath, 4′–8′ long, rather thin, the lobes oblong or lanceolate, divergent or ascending, few-toothed, the teeth and apices bristle-tipped; fruit maturing in the autumn of the second season; styles slender, recurved-spreading; cup hemispheric or top-shaped, its bracts triangular-lanceolate, appressed or the upper slightly squarrose, mostly glabrous; acorn ovoid or ovoid-globose, 6″–10″ high, about twice as long as the cup.

In dry soil, Maine and Ontario to Minnesota, Florida and Missouri. Wood hard, strong, coarse-grained, light brown or red; weight 46 lbs. per cubic foot. May–June. Acorns ripe Sept.–Oct.

5. Quercus velutìna Lam. Black Oak. Quercitron. (Fig. 1232.)

Quercus velutina Lam. Encycl. 1: 721. 1783.
Q. tinctoria Bartram, Travels, 37. Name only. 1791.
Q. coccinea var. *tinctoria* A. Gray, Man. Ed. 5, 454. 1867.

A large forest tree, similar to *Q. coccinea*, maximum height about 150°, trunk diameter 5°; outer bark very dark brown, rough in low ridges, the inner bright orange. Leaves pinnatifid or lobed to beyond the middle, firm, brown-pubescent or sometimes stellate-pubescent when young, when mature glabrous and dark dull green above, pale green and usually pubescent on the veins beneath, the broad oblong or triangular-lanceolate lobes and their teeth bristle-tipped; fruit maturing in the autumn of the second season; cup hemispheric or top-shaped, commonly narrowed into a short stalk, its bracts mostly pubescent, the upper somewhat squarrose; acorn ovoid, ½′–1′ high, more or less longer than the cup.

Maine to Ontario, Minnesota, Florida and Texas. Wood reddish-brown; weight per cubic foot 44 lbs. May–June.

6. Quercus digitàta (Marsh.) Sudw. Spanish Oak. (Fig. 1233.)

Quercus nigra digitata Marsh. Arb. Am. 121. 1785.
Q. falcata Michx. Hist. Chen. Am. 16. *pl. 28.* 1801.
Quercus digitata Sudw. Gard. & For. 5: 99. 1892.

A tree, with maximum height of about 95°, and trunk diameter of 5°. Leaves dark green and glabrous above, gray-tomentulose beneath, deeply pinnatifid into 3–7 linear or lanceolate lobes, often falcate, acuminate, entire or dentate; teeth and apices bristle-tipped; terminal lobes commonly elongated; styles slender; fruit maturing during the second autumn; cup saucer-shaped with a turbinate base, 5″–7″ broad, its bracts ovate, obtuse, appressed; acorn subglobose or depressed, about twice as high as the cup.

In dry soil, Long Island (?), New Jersey to Florida, Missouri and Texas. Wood hard, strong, coarse-grained, light reddish-brown; weight per cubic foot 43 lbs. May–June. Acorns ripe Sept.–Oct.

7. Quercus nàna (Marsh.) Sarg. Bear or Scrub Oak. (Fig. 1234.)

Quercus rubra nana Marsh. Arb. Am. 123. 1785.
Quercus ilicifolia Wang. Amer. 79. *pl. 6. f. 17.* 1787.
Quercus nana Sarg. Gard. & For. 8: 93. 1895.

A shrub or rarely a small tree, often forming dense thickets, maximum height about 25°, and trunk diameter 6′; bark gray, nearly smooth. Leaves mostly obovate, 2′–5′ long, short-petioled, dark green and glabrous above, grayish-white tomentulose beneath, 3–7-lobed; lobes triangular-ovate, acute, bristle-tipped; styles recurved; fruit maturing the second autumn; cup saucer-shaped, 4″–6″ broad, with a turbinate or rounded base; its bracts lanceolate, appressed; acorn globose-ovoid, more or less longer than the cup.

In sandy or rocky soil, Maine to Ohio, Delaware, and the mountains of Virginia and Kentucky. Wood hard, strong, light brown. May. Acorns ripe Oct.–Nov.

A hybrid of this, presumably with *Q. coccinea*, was found by Dr. Robbins at Uxbridge, Mass.

8. Quercus Marylándica Muench. Black-Jack or Barren Oak. (Fig. 1235.)

Quercus nigra β L. Sp. Pl. 995. 1753.
Quercus Marylandica Muench. Hausv. 5: 253. 1770.

A tree, sometimes 60° high, usually lower; maximum trunk diameter 2°; bark nearly black, very rough in ridges. Leaves obovate in outline, stellate-pubescent above and brown-tomentose beneath when young, 3–5-lobed toward the broad usually nearly truncate apex, cuneate below, the lobes short, entire or sparingly toothed, bristle-tipped; mature leaves dark green, glabrous above, paler and more or less floccose beneath, 3′–7′ long, 2′–5′ wide; fruit maturing the second autumn; styles recurved; cup deep, 5″–8″ broad, its bracts oblong-lanceolate, appressed, pubescent; acorn ovoid, 2–3 times as high as the cup.

In dry soil, Long Island, N. Y., to Ohio and Nebraska, south to Florida and Texas. Wood hard, strong, dark brown; weight per cubic foot 46 lbs. May–June. Acorns ripe Oct.–Nov.

Quercus Rúdkini Britton, Bull. Torr. Club, 9: 14, a hybrid of this with *Q. Phellos*, occurs from Staten Island, N. Y., to North Carolina.

Quercus Brittoni W.T. Davis, Scien. Am. 67: 145, is a hybrid with *Q. ilicifolia*. Staten Island, N.Y.

9. Quercus nigra L. Water Oak. (Fig. 1236.)

Quercus nigra L. Sp. Pl. 995. 1753.
Quercus nigra var. *aquatica* Lam. Encycl. 1: 721. 1783.
Quercus aquatica Walt. Fl. Car. 234. 1788.

A tree, with maximum height of about 80° and trunk diameter of 4°; bark gray, rough in ridges. Leaves spatulate or obovate, 1–3-lobed at the apex, or some of them entire and rounded, coriaceous, short-petioled, rather bright green and shining on both sides, finely reticulate-veined, glabrous when mature except tufts of hairs in the axils of the veins beneath, 1½′–3′ long, the lobes low, usually obtuse and bristle-tipped; styles recurved; fruit maturing the second autumn; cup saucer-shaped with a rounded base, 5″–7″ broad, its bracts appressed; acorn globose-ovoid, 2–3 times as high as the cup.

Along streams and swamps or sometimes on the upland, Delaware to Kentucky, Missouri, Florida and Texas. Wood hard, strong, cross-grained, light brown; weight per cubic foot 45 lbs. April–May. Acorns ripe Sept.–Oct. Leaves of seedlings and young shoots incised or pinnatifid, very bristly.

10. Quercus Phéllos L. Willow Oak. (Fig. 1237.)

Quercus Phellos L. Sp. Pl. 994. 1753.

A tree, with slightly roughened reddish-brown bark, attaining a maximum height of about 80° and a trunk diameter of 3°. Leaves narrowly oblong or oblong-lanceolate, entire, acute at both ends, very short-petioled, bristle-tipped, glabrous or very slightly pubescent in the axils of the veins beneath when mature, 2′–4′ long, 4″–12″ wide; styles slender, recurved-spreading; fruit maturing in the autumn of the second season; cup saucer-shaped, nearly flat on the base, 4″–6″ broad; acorn subglobose, 4″–6″ high.

In moist woods, Long Island, N. Y. to Florida, Missouri and Texas. Wood strong, rather soft and close-grained, reddish-brown; weight per cubic foot 46 lbs. April–May. Acorns ripe Sept.–Oct.

Quercus heterophýlla Michx. f. Hist. Am. 2: 87. *pl. 16*, the Bartram Oak, probably a hybrid of *Q. Phellos* with *Q. rubra*, but perhaps a distinct species, intermediate in leaf and fruit characters between the two, occurs from Staten Island to North Carolina. *Q. Phellos* hybridizes also with *Q. nana*.

11. Quercus laurifòlia Michx. Laurel Oak. (Fig. 1238.)

Quercus laurifolia Michx. Hist. Chenes Am. no. 10. *pl. 17*. 1801.

Trunk sometimes 100° tall, reaching 4° in diameter at the base; bark nearly black, with flat ridges. Leaves oblong or oblong-obovate, often somewhat falcate, very green and shining above, paler beneath, glabrous when mature, 1½′–6′ long, 5″–2′ wide, entire, or those of young shoots undulate-lobed, the apex bristle-tipped; styles rather short, recurving; fruit maturing in the autumn of the second season; abortive ovules in the summit of the acorn; cup saucer-shaped, 4″–6″ wide, its base somewhat rounded, its scales ovate, rounded, appressed; acorn ovoid or nearly hemispheric, 3–4 times as long as the cup.

Along streams and swamps, southeastern Virginia to Florida and Louisiana, mostly near the coast. Wood dark reddish-brown, strong; weight per cubic foot 48 lbs.

12. Quercus imbricària Michx. Shingle Oak. (Fig. 1239.)

Quercus imbricaria Michx. Hist. Chen. Am. 9. *pl. 15, 16.* 1801.

A forest tree, with maximum height about 100°, and trunk diameter of 3½°. Leaves oblong or lanceolate, entire, coriaceous, acute at both ends, short-petioled, bristle-tipped, dark green above, persistently gray-tomentulose beneath, 3′–7′ long, 9″–2′ wide; styles recurved; fruit maturing the second autumn; cup hemispheric or turbinate, 5″–7″ broad, its bracts appressed; acorn subglobose, 5″–7″ high.

Central Pennsylvania to Michigan, Nebraska, Georgia, Tennessee and Arkansas. Wood hard, coarse-grained, light reddish-brown; weight per cubic foot 47 lbs. April–May.

Quercus Leàna Nutt. Sylva, 1: 134, *pl. 56*, is a hybrid of this and *Q. velutina*, with intermediate characters. Ohio to Missouri and District of Columbia.

Quercus tridentàta Engelm, *Q. nigra* var. *tridentata* A. DC. Prodr. 16: Part 2, 64, is a hybrid with *Q. Marylandica*. Illinois and Pennsylvania.

A hybrid with *Q. palustris* was found by Dr. Engelmann near St. Louis, Mo.

13. Quercus álba L. White Oak. (Fig. 1240.)

Quercus alba L. Sp. Pl. 996. 1753.

A large forest tree, with light gray bark scaling off in thin plates; maximum height about 150°, trunk diameter 8°. Leaves obovate in outline, green above, pale and more or less glaucous beneath, pubescent when young, nearly glabrous when old, thin, pinnatifid into 3–9 oblong obtuse ascending toothed or entire lobes, 4′–7′ long, 2′–4½′ wide; petioles about ½′ long; styles short, erect; fruit maturing the first season, peduncled; cup depressed-hemispheric, 7″–10″ broad, its bracts thick, obtuse, woolly or at length glabrate, closely appressed; acorn ovoid-oblong, 1′ high or less, 3–4 times as high as the cup.

Maine to Ontario, Minnesota, Florida and Texas. Wood hard, strong, tough, close-grained; color brown; weight per cubic foot 46 lbs. May–June. Acorns ripe Sept.–Oct.

Hybrids with *Q. macrocarpa* have been observed in Illinois; with *Q. minor*, from Illinois to Virginia and South Carolina, and with *Q. Prinus*, near Washington, D. C., and New York.

14. Quercus mìnor (Marsh.) Sarg. Post or Iron Oak. (Fig. 1241.)

Quercus alba minor Marsh. Arb. Am. 120. 1785.
Quercus stellata Wang. Amer. 78. *pl. 6. f. 15.* 1787.
Q. obtusiloba Michx. Hist. Chen. Am. 1. *pl. 1.* 1801.
Quercus minor Sargent, Gard. & For. 2: 471. 1889.

A tree, with rough gray bark, or sometimes a shrub; maximum height about 100° and trunk diameter 4°. Leaves broadly obovate in outline, deeply lyrate-pinnatifid into 3–7 broad rounded often deeply undulate or toothed lobes, when mature firm, glabrous, dark green and shining above, brown-tomentulose beneath, 5′–8′ long, 4′–6′ wide or smaller; petioles stout, ½′–1′ long; fruit maturing the first season, nearly or quite sessile; styles short; cup hemispheric, 6″–8″ broad, base narrowed, its bracts lanceolate, subacute, slightly squarrose; acorn ovoid, 6″–10″ high, 2–3 times as long as the cup.

In dry soil, Massachusetts to southern New York, Michigan, Florida and Texas. Wood hard, close-grained, very durable, brown; weight per cubic foot 52 lbs. May–June. Acorns ripe Sept.–Oct.

15. Quercus lyràta Walt. Swamp, Overcup or Post Oak. (Fig. 1242.)

Quercus lyrata Walt. Fl. Car. 235. 1753.

A large tree, maximum height about 100° and trunk diameter 3½°; bark gray or reddish, in thin plates. Leaves obovate in outline, mostly narrowed at the base, 6′–8′ long, lyrate-pinnatifid or lobed to beyond the middle, thin, when mature bright green, glabrous and shining above, densely white-tomentulose beneath, the lobes lanceolate or oblong, rounded or subacute, entire or toothed, the upper pair the larger and usually divergent; petioles 3″–9″ long; fruit maturing the first season, pedunculed; styles short; cup depressed-globose, 1′–1½′ in diameter, ½′–1′ high, its bracts broad, thin, cuspidate; acorn depressed-globose, ½′–1½′ high, nearly or quite immersed in the cup.

In swamps or along streams, New Jersey to Indiana and Missouri, Florida and Texas. Wood hard, strong, tough, close-grained, very durable, dark brown; weight per cubic foot 52 lbs. April–May.

16. Quercus macrocàrpa Michx. Mossy-cup or Bur Oak. (Fig. 1243.)

Quercus macrocarpa Michx. Hist. Chen. Am. 2, *pl. 23.* 1801.
Quercus olivaeformis Michx. f. Hist. Arb. Am. 2: *pl. 2.* 1812.

A large tree, with gray flaky bark; maximum height about 160°, and trunk diameter 8°. Leaves obovate or oblong-obovate in outline, rather thin, irregularly lobed, pinnatifid, or some coarsely crenate; when mature bright green and shining above, grayish-white-tomentulose beneath, 4′–8′ long, the lobes toothed or entire, rounded, ascending or somewhat divergent; petioles ½′–1′ long; fruit short-pedunculed or sessile, maturing the first season; styles short; cup hemispheric or subglobose, 8″–2′ in diameter, its bracts floccose, thick, hard, ovate or lanceolate, the lower acute, the upper subulate-tipped, the tips forming a fringe around the acorn; acorn 8″–1½′ long, ovoid, 1–2 times as high as the cup.

In rich soil, Nova Scotia to Manitoba, south to Massachusetts, Pennsylvania, Kansas and Texas. Wood hard, strong, tough, close-grained; color dark brown; weight 46 lbs. May–June.

17. Quercus platanoìdes (Lam.) Sudw. Swamp White Oak. (Fig. 1244.)

Q. Prinus platanoides Lam. Encycl. 1: 720. 1783.
Quercus bicolor Willd. Neue Schrift. Ges. Nat. Fr. Berlin, 3: 396. 1801.
Q. platanoides Sudw. Rep. Secy. Agric. 1892: 327. 1893.

A large tree, with flaky gray bark; maximum height about 110° and trunk diameter 9°. Leaves obovate, or oblong-obovate, coarsely toothed or sometimes lobed nearly to the middle, narrowed or rounded at the base, firm, when mature 4′–7′ long, 3½′–4½′ wide, dark green, dull and glabrous above, densely white-tomentulose beneath; petioles stout, 3″–9″ long; fruit maturing the first year; peduncles 2–5 times as long as the petioles; cup hemispheric, its bracts pubescent, lanceolate, appressed, the lower obtuse, the upper acute or acuminate; acorn oblong-ovoid, about 1′ high; cup about 6″ high; seed rather sweet.

In moist or swampy soil, Quebec to Michigan, Georgia and Arkansas. Wood hard, strong, tough, close-grained, light brown; weight 48 lbs. per cubic foot. May–June. Acorns ripe Sept.–Oct.

18. Quercus Michaùxii Nutt. Cow Oak. Basket Oak. (Fig. 1245.)

Quercus Michauxii Nutt. Gen. 2: 215. 1818.

A large tree, with gray flaky bark; maximum height about 100° and trunk diameter 7°. Leaves obovate or broadly oblong, apex acute or acuminate, base narrowed, rounded or subcordate, when mature bright green, shining above, pale and gray tomentulose beneath, sharply toothed, 4′–7′ long, 2½′–4½′ wide, the teeth acute or mucronulate; petioles slender, ½′–1½′ long; fruit maturing the first season, short-peduncled or sessile; styles very short; cup depressed-hemispheric, 1′–1½′ broad, its bracts thick, ovate or lanceolate, appressed; acorns ovoid, 1′–1½′ high, about 3 times as high as the cup.

In moist soil, Delaware to Indiana, Arkansas, Florida and Texas. Wood hard, strong, tough, dense, durable; color light brown; weight 50 lbs. per cubic foot. April–May. Acorns ripe Sept.–Oct, sweet and edible.

19. Quercus Prìnus L. Rock Chestnut Oak. (Fig. 1246.)

Quercus Prinus L. Sp. Pl. 996. 1753.

A large forest tree; maximum height about 100°, and trunk diameter 5°; lower branches spreading; bark brown, ridged, slightly flaky. Leaves coarsely crenate, oblong, oblong-lanceolate or obovate, when mature dark green, glabrous and feebly shining above, finely gray-tomentulose beneath, 5′–8′ long, 1½′–4′ wide; petioles slender, ½′–1½′ long; fruit maturing the first season; peduncles equalling or shorter than the petioles; styles very short; cup hemispheric, ½′–1½′ broad, its bracts tomentose, triangular-ovate, acute or cuspidate, appressed; acorn ovoid, 1′–1½′ high, 2–3 times as high as the cup; seed edible, but not very sweet.

In dry soil, Maine to southern Ontario, Alabama and Tennessee. Wood hard, strong, close-grained, durable; color dark brown; weight per cubic foot 47 lbs. May–June. Acorns ripe Oct.–Nov.

20. Quercus acuminàta (Michx.) Sarg. Chestnut or Yellow Oak. (Fig. 1247.)

Quercus Prinus acuminata Michx. Hist. Chenes Am. no. 5. *pl. 8.* 1801.
Quercus Muhlenbergii Engelm. Trans. St. Louis Acad. 3: 391. 1877.
Quercus acuminata Sarg. Gard. & For. 8: 93. 1895.

A tree with gray flaky bark, much resembling the chestnut; maximum height about 160°, and trunk diameter 3½°. Leaves oblong, lanceolate or sometimes obovate, apex acuminate or acute, base narrowed or rounded; coarsely toothed, when mature dark green and shining above, pale, gray-tomentulose and prominently veined beneath, 4′–6′ long, 1′–2½′ wide; petioles slender, ½′–1′ long; fruit sessile or very short-peduncled, maturing the first season; cup hemispheric, 5″–8″ broad, its bracts floccose, ovate, thick, acute or cuspidate, appressed; acorn ovoid, 6″–10″ high, about twice as high as the cup.

In dry soil, preferring limestone ridges, Vermont and Ontario to Minnesota, south to Alabama and Texas. Wood hard, strong, dense, close-grained, durable, dark brown; weight per cubic foot 54 lbs. May–June. Acorns ripe Oct.–Nov., edible.

21. Quercus prinoides Willd. Scrub Chestnut Oak. (Fig. 1248.)

Quercus prinoides Willd. Neue Schrift. Ges. Nat. Fr. Berlin, 3: 397. 1801.

A shrub, 2°–15° tall, sometimes tree-like, the bark gray. Leaves obovate, coarsely toothed, when mature bright green and somewhat shining above, gray-tomentulose beneath, 2½′–5′ long, 2′–3′ wide, mostly acute or short-acuminate at the apex, narrowed at the base, the teeth short, triangular, subacute or obtuse; petioles slender, 3″–9″ long; fruit sessile, maturing the first season; cup hemispheric, thin, about ½′ broad and one-half as high, its bracts floccose, triangular-ovate or oblong-lanceolate, appressed; acorn ovoid, obtuse, 2–3 times as long as the cup; seed sweet.

In dry sandy or rocky soil, Maine to Minnesota, south to Alabama and Texas. Apparently intergrades with the preceding. April–May. Acorns ripe Sept.–Oct. Called also Chinkapin Oak.

22. Quercus Virginiàna Mill. Live Oak. (Fig. 1249.)

Quercus Virginiana Mill. Gard. Dict. Ed. 8, no. 16. 1768.
Quercus virens Ait. Hort. Kew. 3: 356. 1789.

A tree, with rough brown bark, attaining a maximum height of about 60° and trunk diameter of 7°, but often shrubby, the young shoots puberulent. Leaves evergreen, coriaceous, oblong, elliptic or oblanceolate, apex obtuse, base narrowed or rounded, entire or with a few bristle-tipped teeth, bright green and glabrous above, pale green and puberulent or becoming glabrous beneath, 1′–3′ long; petioles stout, 1″–3″ long; fruit peduncled, maturing the first season; peduncle ¼′–1′ long; cup turbinate, 5″–8″ broad, its bracts closely appressed, ovate or lanceolate; acorn ovoid-oblong, about twice as high as the cup; seed not edible; cotyledons united.

In dry soil, Virginia to Florida, Texas and Mexico, mostly near the coast. Also in Cuba. Wood very hard, tough, close-grained and dense; color yellow-brown; weight per cubic foot 59 lbs. March–April. Acorns ripe Sept–Oct.

Family 8. **ULMÀCEAE** Mirbel, Élém. 2: 905. 1815.

Elm Family.

Trees or shrubs, with alternate simple serrate petioled pinnately veined stipulate leaves, the stipules usually fugacious. Flowers small, monoecious, dioecious, perfect or polygamous, lateral or axillary, clustered, or the pistillate solitary. Perianth 3–9-parted or of 3–9 distinct sepals. Petals none. Stamens in our species as many as the perianth-lobes or sepals and opposite them; filaments straight; anthers ovate or oval, longitudinally dehiscent. Ovary 1-celled (rarely 2-celled), mostly superior; ovule solitary, pendulous, anatropous or amphitropous; styles or stigmas 2. Fruit a samara, drupe or nut. Endosperm of the seed little or none. Embryo straight or curved; cotyledons mostly flat.

About 13 genera and 140 species, widely distributed in temperate and tropical regions.

Flowers borne in clusters on twigs of the preceding season; fruit a samara, or nut-like.
  Flowers expanding before the leaves; calyx 4–9-cleft; fruit a samara. 1. *Ulmus.*
  Flowers expanding with the leaves; calyx 4–5-cleft; fruit nut-like. 2. *Planera.*
Flowers borne on twigs of the season, the pistillate mostly solitary; fruit a drupe. 3. *Celtis.*

1. ÚLMUS L. Sp. Pl. 225. 1753.

Trees, with 2-ranked straight-veined inequilateral serrate leaves, with thin caducous stipules. Flowers perfect or polygamous, fascicled or racemose, greenish, unfolding before the leaves, borne axillary on the twigs of the preceding season. Calyx campauulate, 4–9-lobed, persistent, its lobes imbricated. Filaments erect, slender, exserted. Ovary sessile or stalked, compressed. Styles 2, divergent, stigmatic along the inner margin. Fruit a 1-seeded flat orbicular or oval samara, its membranous wings continuous all around except at the apex, commonly as broad as or broader than the body. Embryo straight. [The ancient Latin name of the elm; Celtic *elm*.]

About 16 species, natives of the northern hemisphere. Besides the following, another occurs in the southwestern United States and one in Mexico.

Leaves smooth or slightly rough above; samara densely ciliate.	
None of the branches corky-winged; samara-faces glabrous.	1. *U. Americana.*
Some or all of the branches corky-winged; samara-faces pubescent.	
Leaves 2′–5′ long; flowers racemose; northern.	2. *U. racemosa.*
Leaves 1′–3′ long; flowers fascicled; southern.	3. *U. alata.*
Leaves very rough above; samara not ciliate; twigs not corky-winged.	4. *U. fulva.*

1. Ulmus Americàna L. American, White or Water Elm. (Fig. 1250.)

Ulmus Americana L. Sp. Pl. 226. 1753.

A large tree, with gray flaky bark, and glabrous or sparingly pubescent twigs and buds; maximum height about 120°, and trunk diameter 11°; the branches not corky-winged, terete. Leaves oval or obovate, apex abruptly acuminate, base obtuse or obtusish, and very inequilateral, sharply and usually doubly serrate, slightly rough above, pubescent or becoming glabrous beneath, 2′–5′ long, 1½′–3′ wide; flowers fascicled; pedicels filiform, drooping, jointed; calyx 7–9-lobed, oblique, its lobes oblong, rounded; samara ovate-oval, reticulate-veined, 5″–6″ long, its faces glabrous, its margins densely ciliate; styles strongly incurved.

In moist soil, especially along streams, Newfoundland to Manitoba, Florida and Texas. Wood hard, strong, close-grained, compact, dark brown; weight per cubic foot 40.5 lbs. March–April. Samaras ripe in May.

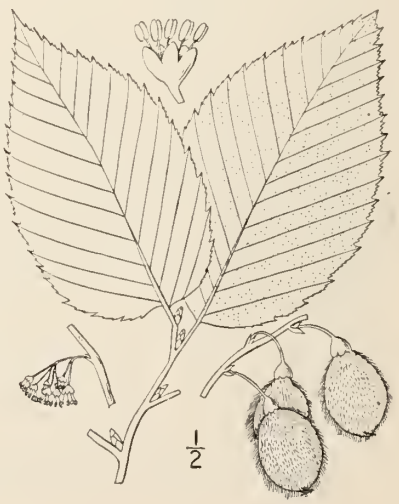
2. Ulmus racemòsa Thomas. Cork or Rock Elm. (Fig. 1251.)

Ulmus racemosa Thomas, Am. Journ. Sci. 19: 170. 1831.

A large tree, attaining a maximum height of about 100° and a trunk diameter of 4°, the young twigs puberulent; bud-scales ciliate and somewhat pubescent; branches, or some of them, winged by narrow plates of cork. Leaves similar to the preceding, but less sharply serrate, smooth above; flowers racemose; pedicels filiform, drooping, jointed; calyx-lobes oblong, rounded; samara oval, 6″–8″ long, its faces pubescent or puberulent, its margins densely ciliate; persistent styles strongly incurved and overlapping.

In rich soil, Quebec to Ontario, Michigan, Tennessee and Nebraska. Wood hard, strong, tough, compact; color light reddish-brown; weight per cubic foot 45 lbs. April. Called also Cliff, Hickory or Swamp Elm.

Ulmus campéstris L., from Europe, distinguished by its nearly or quite glabrous, not ciliate samaras, and wingless branches, rarely escapes from cultivation.



3. Ulmus alàta Michx. Winged Elm. Wahoo. (Fig. 1252.)

Ulmus alata Michx. Fl. Bor. Am. 1: 173. 1803.

A small tree, sometimes 50° high and with a trunk diameter of 2½°; the branches, or most of them, with corky wing-like ridges. Twigs and buds glabrous or nearly so; leaves oblong, oblong-lanceolate or oblong-ovate, acute, doubly serrate, base obtuse, inequilateral and sometimes subcordate, roughish above, pubescent beneath, at least on the veins, 1′–3′ long, ½′–1¼′ wide, the veins ascending, some of them commonly forked; flowers fascicled; pedicels filiform; calyx-lobes obovate, rounded; samara oblong, 4″–5″ long, pubescent on the faces, the margins densely ciliate; styles very slender.

In dry or moist soil, southern Virginia to Florida, west to southern Illinois, Arkansas and Texas. Wood hard, weak, compact; color brown; weight per cubic foot 47 lbs. March.

4. Ulmus fúlva Michx. Slippery, Red or Moose Elm. (Fig. 1253.)

Ulmus pubescens Walt. Fl. Car. 111. 1788. ?

Ulmus fulva Michx. Fl. Bor. Am. 1: 172. 1803.

A tree, with rough gray fragrant bark, maximum height about 70°, and trunk diameter 2½°; twigs rough-pubescent; branches not corky-winged; bud-scales densely brown-tomentose. Leaves ovate, oval or obovate, very rough with short papillae above, pubescent beneath, sharply doubly serrate, acuminate at the apex, obtuse, inequilateral and commonly cordate at the base, 4′–8′ long, 2′–2½′ wide; flowers fascicled; pedicels 2″–3″ long, spreading, jointed near the base; calyx-lobes lanceolate, subacute, samara oval-orbicular, 6″–9″ long, pubescent over the seed, otherwise glabrous, the margins not ciliate, retuse.

In woods, on hills and along streams, Quebec to North Dakota, Florida and Texas. Wood hard, strong, compact, durable; color dark reddish-brown; weight per cubic foot 43 lbs. Foliage and mucilaginous inner bark very fragrant in drying. March–April.

2. PLÁNERA J. F. Gmel. Syst. 2: Part 1, 150. 1791.

Trees, similar to the elms, the flowers monoecious or polygamous, unfolding with the leaves. Staminate flowers fascicled on twigs of the preceding season, the pistillate or perfect ones in the axils of leaves of the year. Calyx 4–5-cleft, campanulate, persistent, the lobes imbricated. Filaments filiform, straight, exserted. Ovary stalked, ovoid, slightly compressed, 1-celled. Styles 2, spreading, stigmatic along the inner side. Fruit nut-like; coriaceous, obliquely ovoid, compressed, ridged on the back, covered with short fleshy processes. Embryo straight. [Name in honor of Johann Jakob Planer, 1743–1789, Professor of Botany in Erfurt.]

A monotypic genus of southeastern North America.

1. Planera aquática (Walt.) J. F. Gmel. Planer-tree. Water Elm. (Fig. 1254.)

Anonymos aquatica Walt. Fl. Car. 230. 1788.
Planera aquatica J. F. Gmel. Syst. 2: Part 1, 150. 1791.

A small tree, sometimes 40° high, and with a trunk 2° in diameter, the foliage nearly glabrous. Leaves ovate or oblong-lanceolate, acute at the apex, obtuse or cordate and usually somewhat inequilateral at the base, serrate, 1′–2′ long; petioles 1½″–2″ long; stipules lanceolate, about as long as the petioles, deciduous; staminate flowers fascicled and somewhat racemose from scaly buds borne at the axils of leaves of the preceding season; perfect or pistillate flowers on short branches; fruit 2″–3″ long, about equalling its stalk, its soft processes ½″ long.

In swamps, Missouri to southern Indiana, Kentucky and North Carolina, south to Louisiana and Florida. Wood soft, weak, compact, light brown; weight per cubic foot 33 lbs. April–May.

3. CÉLTIS L. Sp. Pl. 1043. 1753.

Trees or shrubs, with serrate or entire pinnately veined or in some species 3–5-nerved leaves, and polygamous or monoecious (rarely dioecious?) flowers, borne in the axils of leaves of the season, the staminate clustered, the fertile solitary or 2–3 together. Calyx 4–6-parted or of distinct sepals. Filaments erect, exserted. Ovary sessile. Stigmas 2, recurved or divergent, tomentose or plumose. Fruit an ovoid or globose drupe, the exocarp pulpy, the endocarp bony. Seed-coat membranous. Embryo curved. [Name ancient, used by Pliny for an African Lotus-tree.]

About 60 species, natives of temperate and tropical regions. Besides the following, some 3 others occur in the southern and southwestern parts of North America.

Leaves sharply serrate, thin; ripe drupe 4″–5″ in diameter. 1. *C. occidentalis.*
Leaves entire or nearly so, thick; drupe 2½″–3″ in diameter. 2. *C. Mississippiensis.*

1. Celtis occidentàlis L. Hackberry. Sugar-berry. (Fig. 1255.)

Celtis occidentalis L. Sp. Pl. 1044. 1753.
Celtis pumila Pursh, Fl. Am. Sept. 200. 1814.

A tree or shrub, attaining a maximum height of about 125° and a trunk diameter of 5°, the bark dark and rough, the twigs glabrous. Leaves ovate or ovate-lanceolate, sharply serrate, mostly thin, acute or acuminate at the apex, inequilateral and 3-nerved at the base, pinnately veined, 1½′–4′ long, 1′–2½′ wide, glabrous above, pubescent, at least on the veins, beneath; staminate flowers numerous; pistillate flowers usually solitary, slender-peduncled; calyx-segments linear-oblong, deciduous; drupe globose and purple, or nearly black when mature, or orange, 4″–5″ in diameter, sometimes edible.

In dry soil, Quebec to Manitoba, south to Louisiana, North Carolina, Missouri and Kansas. Wood soft, weak, coarse-grained; color light yellow; weight per cubic foot 40 lbs. April–May. Fruit ripe Sept. Also known as Nettle-tree and False Elm.

2. Celtis Mississippiénsis Bosc. Southern Hackberry. (Fig. 1256.)

Celtis Mississippiensis Bosc, Dict. Agric. 10: 41. 1810.

A tree, similar to the preceding species, but commonly smaller, the bark light gray, rough and warty. Leaves ovate or lanceolate, firm, shining, entire or with a few low sharp teeth, 3-nerved and prominently pinnately veined, glabrous on both sides, long-acuminate at the apex, inequilateral and obtuse or sometimes cordate at the base, 1′–3′ long, ½′–1½′ wide; peduncles mostly shorter than those of the preceding species; drupe globose, purple-black, 2½″–3″ in diameter.

In dry soil, North Carolina to southern Illinois and Missouri, south to Florida and Texas. Probably intergrades with *C. occidentalis*. April. Fruit ripe July–Aug.

Family 9. MORÀCEAE Lindl. Veg. Kingd. 266. 1847.

Mulberry Family.

Trees, shrubs or herbs, mostly with milky sap, alternate or opposite petioled stipulate leaves, and small monoecious or dioecious axillary clustered flowers, or the pistillate flowers solitary in some exotic genera. Calyx mostly 4–5-parted. Petals none. Staminate flowers panicled, spicate or capitate, the stamens as many as the calyx-segments. Filaments erect or inflexed in the bud. Pistillate flowers capitate, spicate or cymose. Ovary superior, 1-celled in our genera. Ovule solitary, pendulous, anatropous. Styles 1 or 2. Fruit various. Embryo straight, curved or spiral.

About 55 genera and 925 species, natives of temperate and tropical regions. The largest genus is *Ficus*, the Fig, of which there are over 600 known species.

Trees or shrubs; stipules fugacious.	
Staminate and pistillate flowers spiked; leaves dentate or lobed.	1. *Morus.*
Staminate flowers racemose or spiked; pistillate capitate.	
Pistillate perianth deeply 4-cleft; leaves entire.	2. *Toxylon.*
Pistillate perianth 3-4-toothed; leaves various.	3. *Broussonetia.*
Erect or twining herbs; stipules persistent.	
Twining vines; pistillate flowers in ament-like clusters.	4. *Humulus.*
Erect herb; pistillate flowers spicate.	5. *Cannabis.*

1. MÒRUS L. Sp. Pl. 986. 1753.

Trees or shrubs, with milky sap, alternate dentate and often lobed, 3-nerved leaves, fugacious stipules, and small monoecious or dioecious flowers, in axillary ament-like spikes, the pistillate spikes ripening into a succulent aggregate fruit. Staminate flowers with a 4-parted perianth, its segments somewhat imbricated, and 4 stamens, the filaments inflexed in the bud, straightening and exserted in anthesis. Pistillate flowers with a 4-parted persistent perianth, which becomes fleshy in fruit, a sessile ovary, and 2 linear spreading stigmas. Fruiting perianth enclosing the ripened ovary, the exocarp succulent, the endocarp crustaceous. Albumen scanty; embryo curved. [The ancient name of the mulberry; Celtic *mor.*]

About 10 species, natives of the northern hemisphere. Besides the following, another occurs in the southwestern United States.

Leaves rough above, pubescent beneath; fruit purple; spikes 1′–1½′ long.	1. *M. rubra.*
Leaves smooth and glabrous, or very nearly so, on both sides; fruit nearly white; spikes 5″–7″ long.	2. *M. alba.*

1. Morus rùbra L. Red Mulberry. (Fig. 1257.)

Morus rubra L. Sp. Pl. 986. 1753.

A tree, attaining a maximum height of about 65° and a trunk diameter of 7°, the bark brown and rough. Leaves ovate or nearly orbicular in outline, scabrous above, persistently pubescent beneath, or when young almost tomentose, acuminate at the apex, rounded, truncate or cordate at the base, serrate-dentate or 3–7-lobed, 3′–5′ long; petioles slender, 7″–18″ long; staminate spikes drooping, 1½′–3′ long; pistillate spikes spreading or pendulous in fruit, 1′–1½′ long, 4″–5″ in diameter when mature, slender-peduncled, dark purple-red, delicious.

In rich soil, Vermont and Ontario to Michigan and South Dakota, south to Florida and Texas. Wood soft, weak, compact, durable; color light yellow; weight per cubic foot 37 lbs. April–May. Fruit ripe in June.

2. Morus álba L. White Mulberry. (Fig. 1258.)

Morus alba L. Sp. Pl. 986. 1753.

A small tree, sometimes 40° high and with a trunk 3° in diameter, the bark light gray, rough, the branches spreading. Leaves ovate, thin, smooth, glabrous and somewhat shining on both sides, acute or abruptly acuminate at the apex, rounded, truncate or cordate at the base, varying from serrate to variously lobed, 2′–6′ long; petioles slender, shorter than the blades; staminate spikes slender, drooping, about 1′ long; pistillate spikes oblong or subglobose, drooping, 5″–7″ long, 3″ in diameter and white or pinkish when mature, not as succulent as those of the preceding species.

Sparingly escaped from cultivation, Maine and Ontario to Florida. Introduced from the Old World for feeding silkworms. May. Fruit ripe July–Aug.

2. TÓXYLON Raf. Am. Month. Mag. 2: 118. 1817.

[MACLURA Nutt. Gen. 2: 233. 1818.]

A tree, with milky sap, thick entire dark green alternate petioled pinnately veined leaves, stout axillary spines, caducous stipules and dioecious axillary flowers, the staminate racemose, the pistillate capitate. Staminate flowers with a 4-parted calyx, its segments valvate, and 4 stamens, the filaments inflexed in the bud, straightening and somewhat exserted in anthesis. Pistillate flowers with a 4-cleft calyx enclosing the sessile ovary, and a filiform simple long-exserted style, the calyces becoming fleshy and enlarged in fruit, densely aggregated into a large globular head. Endosperm none; embryo curved. [Name Greek, signifying bow-wood.]

A monotypic genus of the south-central United States.

1. Toxylon pomíferum Raf. Osage Orange. (Fig. 1259.)

Toxylon pomiferum Raf. Am. Month. Mag. 2: 118. 1817.

Maclura aurantiaca Nutt. Gen. 2: 234. 1818.

A tree with ridged brown bark, and spreading branches; maximum height about 60°, and trunk diameter 2½°; foliage puberulent when young, glabrous when mature. Leaves ovate, ovate-lanceolate or ovate-oblong, glossy, entire, 3′–6′ long, apex acuminate, base obtuse, truncate or subcordate; petioles ½′–2′ long; axillary spines straight, sometimes 3′ long; staminate racemes ½′–1′ long, usually numerous; flowers about 1″ broad; head of pistillate flowers peduncled, pendulous, about 1′ in diameter, ripening into a hard yellowish tubercled syncarp 2′–6′ in diameter.

In rich soil, Missouri and Kansas to Texas. Wood hard, very strong, dense, durable; color bright orange; weight per cubic foot 48 lbs. Much planted for hedges and occasionally spontaneous in the East. May–June. Fruit ripe Oct.–Nov.

3. BROUSSONÉTIA L'Her; Vent. Tabl. 3: 547. 1799.

Trees, with milky sap, the leaves alternate, petioled, entire, serrate, or 3–5-lobed, 3-nerved at the base. Flowers dioecious, the staminate in cylindric ament-like spikes, the pistillate capitate. Staminate flowers with a deeply 4-cleft perianth, 4 stamens, and a minute rudimentary ovary. Pistillate flowers with an ovoid or tubular 3–4-toothed perianth, a stalked ovary and a 2-cleft style. Head of fruit globular, the drupes red, exserted beyond the persistent perianth. [Name in honor of Broussonet, French naturalist.]

About 4 species, natives of eastern Asia.

1. Broussonetia papyrífera (L.) Vent. Paper Mulberry. (Fig. 1260.)

Morus papyrifera L. Sp. Pl. 986. 1753.
Broussonetia papyrifera Vent. Tabl. 3: 548. 1799.

A small tree, sometimes 40° high, the young shoots hirsute-tomentose. Leaves mostly ovate, thin, long-petioled, serrate nearly all around, often deeply 3-lobed, sometimes with a lobe on one side only, as in *Sassafras*, rarely 5-lobed, rough above, tomentose beneath, 3′–8′ long, the sinuses rounded; petioles ½′–3′ long, hirsute-tomentose, at least when young; spikes of staminate flowers 2′–3′ long; peduncled; heads of pistillate flowers ½′–1′ in diameter, stout-peduncled.

Escaped from cultivation, southern New York to Georgia and Missouri. May–June.

4. HÙMULUS L. Sp. Pl. 1028. 1753.

Twining herbaceous perennial rough vines, with broad opposite thin petioled palmately veined serrate 3–7-lobed or undivided leaves, lanceolate membranous persistent stipules, and dioecious axillary flowers, the staminate panicled, the pistillate in ament-like drooping clustered spikes. Staminate flowers with a 5-parted calyx, the segments distinct and imbricated, and 5 short erect stamens. Pistillate flowers in 2's in the axil of each bract of the ament, consisting of a membranous entire perianth, clasping the ovary, and 2 filiform caducous stigmas. Fruiting aments cone-like, the persistent bracts subtending the compressed ovate achenes. Endosperm fleshy. Embryo spirally coiled. [Name said to be the diminutive of the Latin *humus*, earth.]

Two species, the following widely distributed through the north temperate zone, the other native of northeastern Asia.

1. Humulus Lùpulus L. Hop.
(Fig. 1261.)

Humulus Lupulus L. Sp. Pl. 1028. 1753.

A dextrorsely twining or prostrate vine, often 25° long, very rough with stiff reflexed hairs. Leaves orbicular or ovate in outline, slender-petioled, deeply 3–7-cleft or some of the upper ones ovate, acute and merely serrate; petioles ½′–3′ long; stipules reflexed, ovate or lanceolate, acuminate, 4″–12″ long; panicles of staminate flowers 2′–5′ long; ripe pistillate clusters (hops) 1′–2½′ long; fruiting bracts broadly ovate, concave, thin, glabrous or nearly so, obtuse, much longer than the achenes; fruiting calyx and achene strongly resinous-aromatic.

In thickets and on river-banks, Nova Scotia to Manitoba, south to southern New York, Pennsylvania, in the Alleghanies to Georgia, to Kansas, and in the Rocky Mountains to Arizona and New Mexico. Extensively escaped from cultivation. Native also of Europe and Asia. July–Aug. Fruit ripe Sept.–Oct.

5. CÁNNABIS L. Sp. Pl. 1027. 1753.

A stout erect rough and pubérulent herb, with alternate and opposite petioled digitately 5–11-divided thin leaves, persistent subulate stipules, and greenish dioecious axillary flowers, the staminate paniculed, the pistillate spicate. Staminate flowers with a 5-parted calyx, the sepals distinct and imbricated, and 5 short stamens. Pistillate flowers solitary in the axils of foliaceous bracts, consisting of a thin entire calyx clasping the sessile ovary, and 2 filiform caducous stigmas. Fruit a compressed achene. Endosperm fleshy; embryo curved. [The classic name of hemp.]

A monotypic genus of central Asia.

1. Cannabis sativa L. Hemp.
(Fig. 1262.)

Cannabis sativa L. Sp. Pl. 1027. 1753.

An annual branching herb, 3°–10° tall, the inner fibrous bark very tough, the branches nearly erect. Leaves divided to the base, the segments lanceolate or linear-lanceolate, acuminate at both ends, sharply and coarsely serrate, 3′–6′ long, ¼′–1′ wide; staminate panicles narrow, loose, pedúncled, 3′–5′ long; pedicels filiform, bracteolate, 1″–3″ long; pistillate spikes erect, leafy-bracted, 1′ long or less in fruit; achene crustaceous, ovoid-oblong, about 2″ high.

In waste places, New Brunswick to Ontario and Minnesota, south to North Carolina, Tennessee and Kansas. Widely distributed in all temperate regions through cultivation, and occasionally a troublesome weed. Native of Europe and Asia. July–Sept.

Family 10. URTICÀCEAE Reichenb. Consp. 83. 1828.

NETTLE FAMILY.

Herbs (some tropical species shrubs or trees), with watery sap, alternate or opposite mostly stipulate simple leaves, and small greenish dioecious, monoecious or polygamous flowers, variously clustered. Calyx 2–5-cleft, or of distinct sepals. Petals none. Stamens in the staminate flowers as many as the lobes or segments of the calyx (sepals) and opposite them, the filaments inflexed and anthers reversed in the bud, straightening at anthesis. Ovary superior, 1-celled; style simple; stigma capitate and penicillate, or filiform; ovule solitary, erect or ascending, orthotropous, or in some genera partly amphitropous. Fruit an achene. Endosperm oily, usually not copious; embryo straight.

About 40 genera and 475 species of wide geographic distribution.

Herbs with stinging hairs.
- Leaves opposite; both kinds of flowers 4-parted; achene straight. 1. *Urtica.*
- Leaves alternate; staminate flowers 5-parted; achene oblique. 2. *Urticastrum.*

Herbs without stinging hairs.
- Flower-clusters panicled or spiked, not involucrate; leaves mostly opposite.
  - Pistillate calyx 3-parted or of 3 sepals. 3. *Adicea.*
  - Pistillate calyx 2–4-toothed or entire. 4. *Boehmeria.*
- Flower-clusters involucrate by leafy bracts; leaves alternate. 5. *Parietaria.*

1. URTÌCA L. Sp. Pl. 983. 1753.

Annual or perennial simple or branching herbs, with stinging hairs, opposite 3–7-nerved petioled dentate or incised leaves, and distinct or connate stipules. Flowers very small and numerous, axillary, cymose-paniculate, or glomerate, dioecious, monoecious or androgynous. Staminate flowers with a deeply 4-parted calyx and 4 stamens. Pistillate calyx 4-parted, the segments unequal, the exterior ones usually smaller than the inner; ovary straight; stigma sessile or nearly so; ovule erect, orthotropous. Achene compressed, ovate or oblong, enclosed by the persistent membranous or slightly fleshy calyx. Seed-coat thin; endosperm little; cotyledons broad. [The ancient Latin name.]

About 30 species of wide geographic distribution.

Perennials, 2°–7° tall; flower-clusters large, compound.
- Leaves ovate, cordate at base. 1. *U. dioica.*
- Leaves laciniate, rarely cordate. 2. *U. gracilis.*

Annuals, 6′–2½° tall; flower-clusters small, mostly glomerate.
- Leaves oval, laciniate-dentate; plant leafy at the top. 3. *U. urens.*
- Leaves ovate or lanceolate, crenate; upper leaves very small. 4. *U. chamaedryoides.*

1. Urtica dioìca L. Stinging or Great Nettle. (Fig. 1263.)

Urtica dioica L. Sp. Pl. 984. 1753.

Perennial, densely beset with stinging hairs, stem rather stout, 2°–4° tall, puberulent above. Leaves thin, ovate, long-petioled, acute or acuminate at the apex, cordate at the base, sharply or incisely serrate with triangular or lanceolate acute teeth, pubescent beneath, 3–5-nerved, 3′–5′ long, 1′–3′ wide; petioles very slender, shorter than the blades; stipules lanceolate; flower-clusters large, compound, cymose-paniculate; flowers dioecious or androgynous.

In waste places, Nova Scotia to Ontario and Minnesota, south to South Carolina and Missouri. Naturalized from Europe. Native also of Asia. Plant lower, stouter and much more stinging than the following species. July–Sept.

2. Urtica grácilis Ait. Slender Nettle. (Fig. 1264.)

Urtica gracilis Ait. Hort. Kew. 3: 341. 1789.

Perennial, sparingly armed with stinging hairs, stem usually slender, erect, simple or with few erect branches, 2°–7° tall. Leaves lanceolate or ovate-lanceolate, slender-petioled, long-acuminate at the apex, narrowed or sometimes rounded at the base (rarely subcordate), sharply serrate, 3–5-nerved, sparingly pubescent, 3′–6′ long, ½′–1½′ wide; petioles shorter than the blades, usually bristly; stipules lanceolate; flower-clusters compound, smaller than those of the preceding species, but commonly longer than the petioles; flowers dioecious or androgynous.

In dry soil, Nova Scotia to British Columbia, south to North Carolina, Louisiana and Kansas. June–Oct.

3. Urtica ùrens L. Small Nettle. (Fig. 1265.)

Urtica urens L. Sp. Pl. 984. 1753.

Annual, stem rather stout, 6′–18′ high, ascending or erect, it and its slender branches stinging-bristly. Leaves thin, glabrous or very nearly so, elliptic, oval or ovate in outline, deeply incised or sometimes doubly serrate, with acute, ascending or spreading teeth, 3–5-nerved, obtuse at both ends, or acutish, 1′–3′ long, slender-petioled; petioles often as long as the blades; stipules short; flower-clusters oblong, rather dense, mostly shorter than the petioles; flowers androgynous.

In waste places, Newfoundland to northern New York, New Jersey and Florida. Also on the Pacific Coast. Naturalized from Europe. May–Sept.

4. Urtica chamaedryoides Pursh. Weak Nettle. (Fig. 1266.)

Urtica chamaedryoides Pursh, Fl. Am. Sept. 113. 1814.

Annual, sparingly stinging-bristly but otherwise nearly or quite glabrous, stem very slender, weak, ascending, simple or branched, 6′–3° long. Leaves slender-petioled, thin, crenate-dentate, the lower broadly ovate or orbicular, obtuse at the apex and usually cordate at the base, ½′–1½′ wide, the upper ovate or lanceolate, acute or acuminate at the apex, rounded or narrowed at the base, the uppermost very small; stipules lanceolate-subulate; flower-clusters small, glomerate, shorter than the petioles; flowers androgynous.

In thickets, Kentucky to Arkansas, south to Georgia and Texas. April–Aug.

2. URTICÁSTRUM Fabr. Enum. 204. 1759.

[LAPORTEA Gaud. in Freyc. Voy. Bot. 498. 1826.]

Perennial herbs, armed with stinging hairs, the leaves broad, alternate, serrate, petioled, the flowers monoecious or dioecious, sessile in loose axillary compound cymes. Staminate flowers in our species with 5 imbricated sepals, 5 stamens and a rudimentary ovary. Pistillate flowers with 4 unequal sepals, the outer 1 or 2 minute, an oblique or nearly straight compressed ovary and a subulate slender persistent style; ovule erect. Achene very oblique, flat, reflexed. Seed-coat membranous. Endosperm scanty or wanting. [Latin, star nettle.]

About 25 species, mostly of tropical distribution, only the following North American.

1. **Urticastrum divaricàtum** (L.) Kuntze. Wood Nettle. (Fig. 1267.)

Urtica divaricata L. Sp. Pl. 985. 1753.
Laportea Canadensis Gaud. in Freyc. Voy. Bot. 498. 1826.
Urticastrum divaricatum Kuntze, Rev. Gen. Pl. 635. 1891.

Stem rather stout, erect or ascending, 1½°–4° tall. Leaves thin, ovate, long-petioled, acuminate or acute at the apex, sharply serrate, 3-nerved and pinnately veined, glabrous or with some stinging hairs, 3′–7′ long, 2′–5′ wide; petioles very slender, 1½′–5′ long; stipule solitary, small, lanceolate, 2-cleft, commonly deciduous; flower-clusters large and loose, often longer than the petioles, the lower staminate, the upper pistillate, divergent, 2′–6′ broad in fruit; ultimate branches of the fruiting clusters flat, cuneate, emarginate; achene twice as long as the calyx, glabrous, 1½″ long.

In rich woods, Nova Scotia to Ontario and Minnesota, south to Florida and Kansas. Ascends to 3000 ft. in the Adirondacks. July–Aug.

3. **ADÍCEA** Raf. Ann. Nat. 179. 1815.
[Pilea Lindl. Coll. *pl. 4.* 1821.]

Annual or perennial, glabrous or pubescent stingless herbs, with opposite petioled mostly 3-nerved leaves, connate stipules, and small numerous monoecious or dioecious flowers in axillary cymose or glomerate clusters. Staminate flowers mostly 4-parted (sometimes 2- or 3-parted) and with a rudimentary ovary. Pistillate flowers 3-parted, the segments in most species unequal, each subtending a staminodium in the form of a concave scale; ovary straight; stigma sessile, pedicillate. Achene compressed, ovate or suborbicular. Seed-coat thin. Endosperm scanty or none. [Name unexplained.]

About 150 species, chiefly in the tropics, most abundant in tropical America. Besides the following, another occurs in the southern United States.

1. **Adicea pùmila** (L.) Raf. Clearweed. Richweed. (Fig. 1268.)

Urtica pumila L. Sp. Pl. 984. 1753.
Adicea pumila Raf.; Torr. Fl. N. Y. 2: 223. As synonym. 1843.
Pilea pumila A. Gray, Man. 437. 1848.

Annual, stems pellucid, erect, usually branched, glabrous, succulent, 6′–2° high. Leaves membranous, ovate, slender-petioled, acuminate or acute at the apex, rounded or narrowed at the base, 3-nerved, coarsely dentate, 1′–5′ long, sparingly pubescent with scattered hairs; petioles often as long as the blades and much longer than the pistillate flower-clusters; sepals of the pistillate flowers lanceolate, nearly equal; achene ovate, acute, ½″ long.

In swampy, shaded situations, often on old logs, New Brunswick to western Ontario and Minnesota, south to Florida, Louisiana and Kansas. Ascends to 3000 ft. in Virginia. Also in Japan. July–Sept.

4. **BOEHMÈRIA** Jacq. Stirp. Am. 246. *pl. 157.* 1763.

Perennial stingless herbs (some tropical species shrubs or even trees), with opposite or alternate petioled 3-nerved leaves, distinct or connate stipules, and small monoecious or dioecious flowers, glomerate in axillary spikes or heads, the fertile clusters sometimes leafy at the summit. Staminate flowers mostly 4-parted or the calyx of 4 distinct sepals, usually with a rudimentary ovary. Pistillate calyx tubular or urn-shaped, 2–4-toothed or entire, enclosing the sessile or stalked ovary; stigma subulate, papillose or pubescent along one side. Achene enclosed by the withering-persistent pistillate calyx. [In honor of Georg Rudolph Boehmer, 1723–1803, Professor in Wittenberg.]

About 50 species, mostly natives of tropical regions, the following of eastern North America.

1. Boehmeria cylíndrica (L.) Willd. False Nettle. (Fig. 1269.)

Urtica cylindrica L. Sp. Pl. 1396. 1753.
Boehmeria cylindrica Willd. Sp. Pl. 4: 340. 1805.

A perennial rough pubescent or nearly smooth and glabrous erect branching herb, 1°–3° tall. Stem stiff; leaves ovate, ovate-oblong or ovate-lanceolate, thin, slender-petioled, opposite, or some alternate, coarsely dentate, 1′–3′ long, ½′–1½′ wide; petioles shorter than the blades; stipules lanceolate-subulate, distinct; flowers dioecious or androgynous; staminate spikes usually interrupted, the pistillate mostly continuous, ¼′–1½′ long; achene ovate-oval, acute, rather less than 1″ long.

In moist soil, Quebec and Ontario to Minnesota, south to Florida and Kansas. July–Sept.

Boehmeria cylíndrica scábra Porter, Bull. Torr. Club, 16: 21. 1889.

Leaves firm, rough above, tomentose beneath, short-petioled or nearly sessile, usually reflexed; fruiting spikes much longer than the petioles. Pennsylvania, New Jersey, and southern New York.

5. PARIETÀRIA L. Sp. Pl. 1052. 1753.

Annual or perennial stingless diffuse or erect herbs, with alternate entire 3-nerved petioled leaves, no stipules, and axillary glomerate polygamous flowers, involucrate by leafy bracts. Calyx of the staminate flowers 4-parted or of 4 (rarely 3) distinct sepals. Fertile flowers with a tubular or campanulate 4-lobed calyx investing the ovary, a short or slender style, and a penicillate stigma. Achene enclosed by the withering-persistent pistillate calyx. [Ancient Latin, referring to the growth of some species on walls.]

About 7 species, widely distributed; besides the following, another occurs in the southern United States.

1. Parietaria Pennsylvánica Muhl. Pennsylvania Pellitory. (Fig. 1270.)

Parietaria Pennsylvanica Muhl.; Willd. Sp. Pl. 4: 955. 1806.

Annual, pubescent, stem weak, simple or sparingly branched, ascending or reclining, very slender, 4′–15′ long. Leaves lanceolate or oblong-lanceolate, membranous, dotted, acuminate at the apex, narrowed at the base, 3-nerved and with 1–3 pairs of weaker veins above, slender-petioled, 1′–3′ long, ¼′–½′ wide; petioles ¼′–1′ long, almost filiform; flowers glomerate in all except the lowest axils, the clusters shorter than the petioles; bracts of the involucre linear, 2–3 times as long as the flowers; style almost none; achene about ½″ long.

On dry rocks and banks, Ontario to British Columbia, south to Florida, Colorado and Mexico. June–Aug.

Family 11. LORANTHÀCEAE D. Don, Prodr. Fl. Nepal. 142. 1825.

Mistletoe Family.

Parasitic green shrubs or herbs, containing chlorophyll, growing on woody plants and absorbing food from their sap through specialized roots called haustoria (a few tropical species terrestrial). Leaves in the following genera opposite, in *Razoumofskya* reduced to opposite scales. Flowers regular, terminal or axillary, clustered or solitary, dioecious or monoecious, and perianth simple, or in some exotic genera perfect, and with perianth of both calyx and corolla. Calyx-tube adnate to the ovary, its limb entire, toothed or lobed. Stamens 2–6; anthers 2-celled or confluently 1-celled. Ovary solitary, erect; style simple or none; stigma terminal, undivided, obtuse. Fruit a berry. Seed solitary, its testa indistinguishable from the endosperm, which is usually copious and fleshy; embryo terete or angled.

About 21 genera and 500 species, widely distributed; most abundant in tropical regions.

Leaves scale-like, united at the base; anthers 1-celled; berry peduncled. 1. *Razoumofskya.*
Leaves thick, flat; anthers 2-celled; berry sessile. 2. *Phoradendron.*

1. RAZOUMÓFSKYA Hoffm. Hort. Mosq. 1808.

[ARCEUTHOBIUM Bieb. Fl. Taur. 3: 629. 1819.]

Small or minute fleshy glabrous plants, parasitic on the branches of coniferous trees, their branches 4-angled, and leaves reduced to opposite connate scales. Flowers dioecious, not bracted, solitary or several together in the axils of the scales. Staminate flowers with a 2–5-parted calyx and usually an equal number of stamens, the anthers sessile on the segments. Pistillate flowers with the ovary adnate to the tube of the calyx, the calyx-limb 2-parted. Disk present in both kinds of flowers. Berry fleshy, ovoid, more or less flattened, borne on a short somewhat recurved peduncle. Embryo enclosed in the copious endosperm. [In honor of Alexis Razoumofski, Russian botanist.]

About 10 species. Besides the following, 7 or 8 others occur in western North America and Mexico, 2 in Europe and Asia.

1. Razoumofskya pusílla (Peck) Kuntze. Small Mistletoe. (Fig. 1271.)

Arceuthobium pusillum Peck, Rep. N. Y. State Mus. 25: 69. 1873.
Arceuthobium minutum Engelm. Bull. Torr. Club, 2: 43. Without description. 1871.
Razoumofskya pusilla Kuntze, Rev. Gen. Pl. 587. 1891.

Plant inconspicuous, stems 2″–10″ long, nearly terete when fresh, somewhat 4-angled when dry, simple or sparingly branched, greenish-brown, slender. Scales suborbicular, appressed, obtuse, about ½″ wide, connate at the base; flowers strictly dioecious (the staminate and pistillate plants sometimes on different trees), solitary in most of the axils, longer than the scales; berry ovoid-oblong, acute, about 1″ long, nodding on a slightly exserted peduncle; seeds enclosed in a viscid mucus.

On twigs of spruces, New Hampshire, northern New York and the Pocono region of Pennsylvania. June.

2. PHORADÉNDRON Nutt. Journ. Acad. Phila. (II.) 1: 185. 1847–50.

Shrubs, parasitic on trees, with opposite coriaceous flat entire or undulate faintly nerved leaves, terete usually jointed and brittle twigs, and dioecious axillary spicate bracted small flowers, solitary or several in the axil of each bract. Staminate flowers with a 3-lobed (rarely 2–4-lobed) globose or ovoid calyx, bearing a sessile transversely 2-celled anther at the base of each lobe. Pistillate flowers with a similar calyx adnate to the ovoid inferior ovary. Style short, obtuse or capitate. Fruit a sessile ovoid or globose fleshy berry. Endosperm copious. [Greek, tree-thief, from its parasitic habit.]

About 80 species, all American. Besides the following, 5 or 6 others occur in the Western States.

1. Phoradendron flavéscens (Pursh) Nutt. American Mistletoe. (Fig. 1272.)

Viscum flavescens Pursh, Fl. Am. Sept. 114. 1814.
Phoradendron flavescens Nutt.; A. Gray, Man. Ed. 2, 383. 1856.

A branching glabrous or slightly pubescent shrub, the twigs rather stout, terete, brittle at the base. Leaves oblong or obovate, rounded at the apex, narrowed into short petioles, 3–5-nerved, entire, 1′–2′ long, 5″–10″ wide, dark green, coriaceous; petioles 1″–4″ long; spikes solitary, or 2 or 3 together in the axils, linear, shorter than the leaves; berry globose, white, about 2″ in diameter

Parasitic on deciduous leaved trees, notably on the Tupelo and Red Maple, central New Jersey to Ohio, Indiana and Missouri, south to Florida and Texas. May–July.

Family 12. SANTALÀCEAE R. Br. Prodr. Fl. Nov. Holl. 1: 350. 1810.

SANDALWOOD FAMILY.

Herbs or shrubs (some exotic genera trees), with alternate or opposite entire exstipulate leaves. Flowers clustered or solitary, axillary or terminal, perfect, monoecious or dioecious, mostly greenish. Calyx adnate to the base of the ovary, or to the disk, 3–6-lobed, the lobes valvate. Petals none. Stamens as many as the calyx-lobes and inserted near their bases, or opposite them upon the lobed or annular disk; filaments slender or short. Ovary 1-celled; ovules 2–4, pendulous from the summit of the central placenta; style cylindric, conic or sometimes none; stigma capitate. Fruit a drupe or nut. Seed 1, ovoid or globose. Testa none; endosperm copious, fleshy; embryo small, apical.

About 26 genera and 250 species, mostly of tropical distribution, a few in the temperate zones.

Perennial herbs: flowers perfect, cymose or solitary. 1. *Comandra.*
Shrub; flowers imperfect, mostly dioecious, racemose. 2. *Pyrularia.*

1. COMÁNDRA Nutt. Gen. 1: 157. 1818.

Glabrous erect perennial herbs, some (or all?) parasitic on roots of other plants. Leaves alternate, oblong, oval, lanceolate or linear, entire, pinnately veined. Flowers perfect, terminal or axillary, rarely solitary, cymose, bractless. Calyx campanulate, the base of its tube adnate to the ovary, its limb 5-lobed (rarely 4-lobed). Stamens 5, or rarely 4, inserted at the bases of the calyx-lobes and between the lobes of the disk, attached to the middle of the lobes by tufts of hairs. Anthers ovate, 2-celled. Fruit drupaceous, globose or ovoid, crowned by the persistent calyx. [Greek, referring to the hairy attachments of the anthers.]

Four known species, the following North American, one European.

Cymes mostly corymbose-clustered at the summit of the stem; leaves acute, sessile; style slender.
Leaves oblong, pale green; fruit globose-urn-shaped. 1. *C. umbellata.*
Leaves lanceolate or linear, glaucous; fruit ovoid. 2. *C. pallida.*
Peduncles few, axillary; leaves oval, obtuse, short-petioled; style short. 3. *C. livida.*

1. Comandra umbellàta (L.) Nutt. Bastard Toad-flax. (Fig. 1273.)

Thesium umbellatum L. Sp. Pl. 208. 1753.
Comandra umbellata Nutt. Gen. 1: 157. 1818.

Stem slender, very leafy, usually branched, 6′–18′ tall. Leaves oblong or oblong-lanceolate, pale green, acute or subacute at both ends, sessile, ascending, ½′–1¼′ long, the lower smaller; cymes several-flowered, corymbose at the summit of the plant or also axillary; peduncles filiform, ¼′–1′ long; pedicels very short; calyx greenish-white or purplish, about 2″ high; style slender; drupe globose, 2½″–3″ in diameter, crowned by the upper part of the calyx-tube and its 5 oblong lobes.

In dry fields and thickets, Cape Breton Island to Ontario and British Columbia, south to Georgia, Arizona and California. April–July.

2. Comandra pállida A. DC. Pale Comandra. (Fig. 1274.)

Comandra pallida A. DC. Prodr. 14: 636. 1857.

Similar to the preceding species but paler and glaucous, usually much branched, the leaves narrower, linear or linear-lanceolate, acute or the lowest and those of the stem oblong-elliptic; cymes few–several-flowered, corymbose-clustered at the summit; peduncles usually short; pedicels about 1″ long; calyx purplish, about 2″ high; fruit ovoid-oblong, 3″–4″ high and 2″–2½″ in diameter, crowned by the short upper part of the calyx-tube and its 5 oblong lobes.

In dry soil, Manitoba to British Columbia, south to Minnesota, Kansas, Texas, New Mexico and California. April–July.

3. Comandra lívida Richards. Northern Comandra. (Fig. 1275.)

Comandra livida Richards. App. Frank. Journ. 734. 1823.

Stem slender, usually quite simple, 4′–12′ high. Leaves oval, thin, obtuse or rounded at the apex, narrowed at the base, short-petioled, ½′–1′ long, ¼′–½′ wide; petioles 1″–2″ long; cymes axillary, few (often only 1 to each plant), 1–5-flowered; peduncle shorter than its subtending leaf, filiform; flowers sessile; style very short; drupe globose-oblong, about 3″ in diameter, red, edible, crowned by the ovate calyx-lobes.

In moist soil, Newfoundland to Hudson Bay and the Northwest Territory, south to Vermont, Ontario, Michigan and British Columbia. June–July.

2. PYRULÀRIA Michx. Fl. Bor. Am. 2: 231. 1803.

A branching shrub (the Asiatic species trees), with thin alternate pinnately-veined entire short-petioled deciduous leaves, and dioecious or polygamous small greenish racemose flowers. Staminate flowers with a campanulate 3–5-cleft calyx, the lobes valvate, recurved or spreading, pubescent at the base within; disk of 3–5 distinct glands or scales; stamens 4 or 5, inserted between the glands and opposite the calyx-lobes; filaments short; anthers ovate. Pistillate and perfect flowers with a top-shaped calyx adnate to the obovoid ovary; style short, stout; stigma capitate, depressed. Fruit a pear-shaped or oval drupe, the endocarp thin and endosperm of the seed very oily. [Name from *Pyrus*, the pear, from the similar shape of the fruit.]

Three species, the following and two Asiatic.

1. Pyrularia pùbera Michx. Oil-nut. Buffalo-nut. (Fig. 1276.)

Pyrularia pubera Michx. Fl. Bor. Am. 2: 233. 1803.
Hamiltonia oleifera Muhl.; Willd. Sp. Pl. 4: 1120. 1805.
Pyrularia oleifera A. Gray, Man. Ed. 2, 382. 1858.

A straggling or erect much branched shrub, 3°–15° tall, with terete twigs, the young foliage pubescent. Leaves oblong, oblong-lanceolate or somewhat obovate, nearly glabrous when mature, acute or acuminate at both ends, 3′–5′ long, 8″–1½′ wide; petioles 2″–4″ long; racemes terminating short branches, the staminate many-flowered, 1′–2′ long, the pistillate few-flowered and shorter; pedicels slender, 1½″–2″ long; staminate flowers about 2″ broad; calyx 3–5-cleft; drupe about 1′ long, crowned by the ovate acute calyx-lobes.

In rich woods, southern Pennsylvania to Georgia, mostly in the mountains. May. Fruit ripe Aug.–Sept.

Family 13. ARISTOLOCHIÀCEAE Blume, Enum. Pl. Jav. 1: 81. 1830.

BIRTHWORT FAMILY.

Herbs or shrubs, acaulescent, or with erect or twining and leafy stems. Leaves alternate or basal, petioled, mostly cordate or reniform, exstipulate. Flowers axillary or terminal, solitary or clustered, perfect, mostly large, regular or irregular. Calyx-tube adnate to the ovary, its limb 3-lobed, 6-lobed or irregular. Petals none. Stamens 6–many, inserted on the pistil, the anthers 2-celled, extrorse, their sacs longitudinally dehiscent. Ovary wholly or partly inferior, mostly 6-celled; ovules numerous in each cavity, anatropous, horizontal or pendulous. Fruit a many-seeded mostly 6-celled capsule. Seeds ovoid or oblong, angled or compressed, the testa crustaceous, smooth or wrinkled, usually with a fleshy or dilated raphe; endosperm copious, fleshy; embryo minute.

Five genera and about 200 species, of wide distribution in tropical and temperate regions.

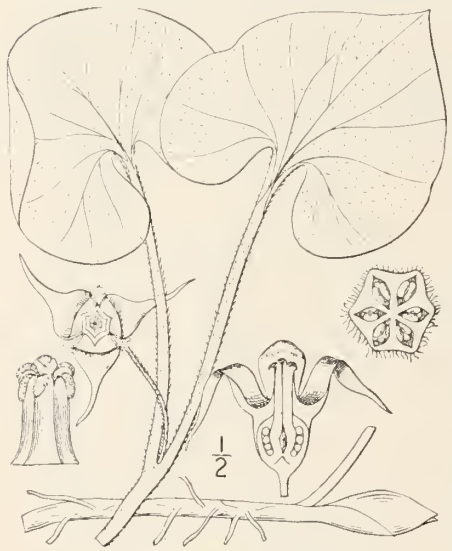
Acaulescent herbs; perianth regular, 3-lobed, persistent; filaments distinct. 1. *Asarum.*
Leafy erect herbs or twining vines; perianth irregular, deciduous; anthers sessile, adnate to the stigma. 2. *Aristolochia.*

1. ÁSARUM L. Sp. Pl. 442. 1753.

Acaulescent perennial often clustered herbs, with slender aromatic branched rootstocks, thick fibrous-fleshy roots, long-petioled cordate ovate hastate or orbicular entire leaves, and solitary large peduncled purple-brown or mottled flowers, borne very near or upon the ground. Calyx campanulate or hemispheric, adnate to the ovary at least below, regularly 3-lobed, the lobes valvate. Stamens 12, inserted on the ovary; filaments short, stout; connective of the anther-sacs more or less continued beyond them as a tip. Ovary partly or wholly inferior, 6-celled, the parietal placentae intruded; ovules numerous, horizontal or pendulous. Capsule coriaceous, crowned by the withering-persistent calyx and stamens, subglobose or hemispheric, at length bursting irregularly or longitudinally dehiscent. Seeds compressed. [The ancient name, meaning obscure.]

About 15 species, natives of the north temperate zone. Besides the following, 3 others occur in western North America. The species are known as *Asarabacca.*

Calyx-lobes lanceolate, acuminate; style 6-lobed; plant pubescent. 1. *A. Canadense.*
Calyx-lobes short, rounded; styles 6, each 2-cleft; plants glabrous or nearly so.
Anthers not pointed; leaves orbicular or broadly ovate; calyx campanulate.
Calyx 6″–8″ long, contracted at the throat. 2. *A. Virginicum.*
Calyx 8″–20″ long, not contracted at the throat. 3. *A. macranthum.*
Anthers pointed; leaves or some of them hastate; calyx urn-shaped. 4. *A. arifolium.*



1. Asarum Canadénse L. Wild Ginger. (Fig. 1277.)

Asarum Canadense L. Sp. Pl. 442. 1753.

Finely pubescent, petioles rather slender, 6′–12′ long. Leaves commonly 2 to each plant, reniform, thin, short-pointed at the apex, 4′–7′ broad, dark green, not mottled, the basal sinus deep and open; flower slender-peduncled from between the bases of the petioles, 1′ broad or more when expanded, brownish purple; calyx ovoid, its tube completely adnate to the ovary, its lobes inflexed in the bud, ovate-lanceolate, acute or long-acuminate, spreading, equalling or longer than the tube; filaments longer than the anthers; style 6-lobed; stigmas radiating on the lobes, capsule 6″–8″ in diameter.

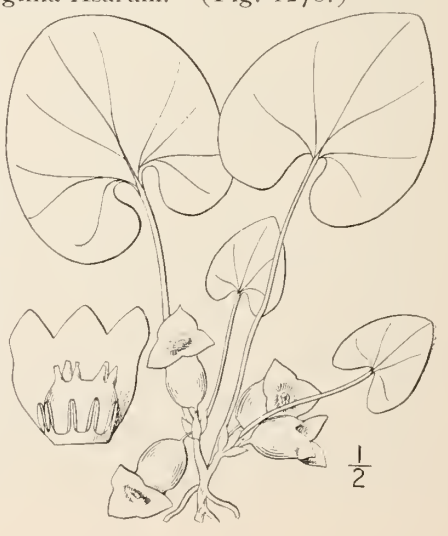
In rich woods, New Brunswick to Manitoba, south to North Carolina, Missouri and Kansas. Ascends to 3000 ft. in Virginia. Called also Canada Snakeroot. April–May. Perhaps includes 2 species. Rootstocks with the flavor of ginger.

2. Asarum Virgínicum L. Virginia Asarum. (Fig. 1278.)

Asarum Virginicum L. Sp. Pl. 442. 1753.

Rootstocks slender, scaly, clustered, simple or branched. Leaves 1–3 to each plant or branch, coriaceous, glabrous, orbicular or broadly ovate, rounded at the apex, 1½′–3′ wide, usually mottled, the basal sinus open or nearly closed; petioles pubescent along one side or glabrous, 3′–7′ long, ascending; flower short-peduncled, purple, 6″–8″ long; calyx campanulate, narrowed at the throat, its tube adnate to the lower part of the ovary, free above, the lobes ovate or nearly semicircular, about one-third as long as the tube; peduncle ¼′–½′ long; filaments much shorter than the anthers; anthers not pointed; styles 6, each 2-lobed, the stigmas sessile below the lobes; capsule hemispheric, about 4″ high.

In rich woods, Virginia and West Virginia to Georgia and South Carolina. Ascends to 2500 ft. in Virginia. May–June.

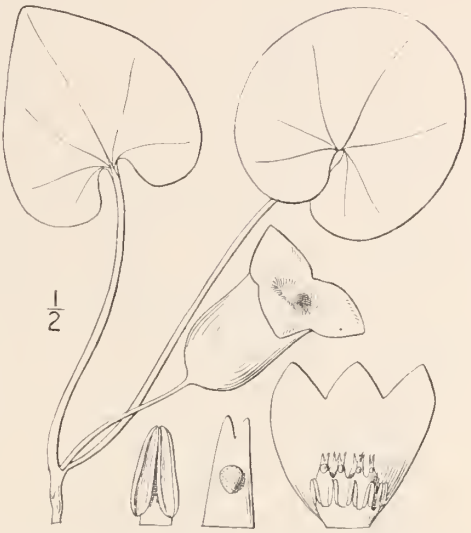


3. Asarum macránthum (Shuttlw.) Small. Large-flowered Asarum. (Fig. 1279.)

Homotropa macranthum Shuttlw.; Small, Mem. Torr. Club, 4: 150, as synonym. 1894.
Asarum macranthum Small, Mem. Torr. Club, 5: 136. 1894.

Glabrous, rootstocks more or less branched. Leaves 1 or 2 to each plant or branch, broadly ovate or suborbicular, dark green and usually mottled above, paler beneath, 2′–4′ long, 1½′–3′ wide, obtuse or subacute at the apex, the basal sinus mostly narrow; petioles 3′–8′ long, ascending; calyx tubular-campanulate, 8″–20″ long, not or scarcely contracted at the throat, the lobes somewhat unequal, obtuse, mottled with violet on the inner side, one-third to one-half as long as the tube; peduncle 8″–20″ long; filaments shorter than the anthers; anthers equally 4-ribbed, not pointed; styles 6, each 2-cleft.

In rich mountain woods, Virginia and North Carolina. May–July.



4. Asarum arifòlium Michx. Halberd-leaved Asarum. (Fig. 1280.)

A. arifolium Michx. Fl. Bor. Am. 1: 279. 1803.

Pubescent, at least on the veins of the leaves, rootstocks slender, usually branched and with 1 or 2 leaves to each branch. Leaves rather thick, usually mottled, obtuse at the apex, 2′–5′ long, some of them hastate, some suborbicular, the basal sinus often broad; petioles more or less pubescent, 3′–8′ long, erect or ascending; flower stout-peduncled, about 1′ long; calyx urn-shaped, much contracted at the throat, the lobes rounded, about one-fifth as long as the tube, which is adnate to the lower half of the ovary; anthers nearly sessile, short-pointed; styles 6, 2-cleft, with a sessile stigma below the cleft; capsule subglobose, about 8″ in diameter.

In woods, Virginia to Tennessee, Florida and Alabama. Ascends to 3000 ft. in Virginia. April–June.

2. ARISTOLÒCHIA L. Sp. Pl. 960. 1753.

Perennial herbs or twining vines. Leaves alternate, mostly petioled and entire (some exotic species 3–7-lobed), cordate, palmately 3–many-nerved. Flowers irregular, solitary or clustered. Calyx adnate to the ovary, at least to its base, the tube narrow, usually inflated around the style and contracted at the throat, the limb spreading or reflexed, entire, 3-6-lobed or appendaged. Stamens mostly 6; anthers sessile, adnate to the short style or stigma, 2-celled, the sacs longitudinally dehiscent. Ovary partly or wholly inferior, mostly 6-celled with 6 parietal placentae. Style 3–6-lobed. Capsule naked, septicidally 6-valved. Seeds very numerous, horizontal, compressed, their sides flat or concave. [Named for its supposed medicinal properties.]

About 180 species, widely distributed in tropical and temperate regions. Besides the following, some 6 others occur in the southern and western United States.

Erect herbs.
- Calyx-tube bent; flowers solitary, on basal scaly branches. — 1. *A. Serpentaria.*
- Calyx-tube straight; flowers axillary, clustered. — 2. *A. Clematitis.*

Tall twining vines; flowers axillary; calyx-tube bent.
- Leaves minutely pubescent; calyx-limb flat, spreading. — 3. *A. macrophylla.*
- Leaves tomentose; calyx-limb rugose, reflexed. — 4. *A. tomentosa.*

1. Aristolochia Serpentària L. Virginia Snakeroot. Serpentary. (Fig. 1281.)

Aristolochia Serpentaria L. Sp. Pl. 961. 1753.

A perennial pubescent nearly erect herb, 10′–3° tall, with short rootstocks and fibrous aromatic roots. Leaves ovate, ovate-lanceolate or oblong-lanceolate, thin, green on both sides, acuminate at the apex, cordate or hastate at the base, 1½′–5′ long, ½′–2′ wide; petioles ¼′–1′ long; lowest leaves reduced to scales; flowers solitary aud terminal, on slender basal scaly branches; tube of the calyx curved like the letter S, enlarged at the ovary and at its throat, the limb short, spreading, slightly 3-lobed; authers contiguous in pairs; stigma 3-lobed; capsule subglobose, ridged, about ½′ in diameter. Flowers sometimes cleistogamous.

In dry woods, Connecticut and New York to Michigan, Florida, Louisiana and Missouri. Ascends to 2500 ft. in Virginia. June–July. Fruit ripe Sept.

2. Aristolochia Clematìtis L. Birthwort. (Fig. 1282.)

Aristolochia Clematitis L. Sp. Pl. 962. 1753.

Herbaceous, perennial; stem erect, glabrous, zigzag, striate, 1°–2° tall. Leaves dark green, reniform, subacute or obtuse at the apex, glabrous or their margins minutely spinulose-ciliate, strongly reticulate-veiued, 2′–5′ wide; petioles shorter thau the blades; flowers fascicled in the axils, 1′–1½′ long; tube of the calyx yellowish green, straight, enlarged around the ovary, the lobes appendaged; anthers equidistant.

Near Ithaca and Flushing, N. Y. Escaped from cultivation. Native of southern Europe. Summer.

3. Aristolochia macrophýlla Lam. Dutchman's Pipe. (Fig. 1283.)

Aristolochia macrophylla Lam. Encycl. 1: 255. 1783.
Aristolochia Sipho L'Her. Stirp. Nov. 13. 1784.

A twiuing vine, the steu sometimes 1′ in diameter aud 30° long, the brauches very slender, terete, green, glabrous. Leaves thin, broadly reniform or suborbicular, densely pubescent beneath wheu young, glabrous or nearly so and 6′–15′ broad when mature; petioles slender, 1′–4′ long; peduncles solitary or 2 or 3 together in the axils, about as long as the petioles, each with a suborbicular clasping bract at about the middle ½′–1′ in diameter; calyx-tube strongly curved, 1′ or more long, inflated above the ovary, contracted at the throat, yellowish-greeu, veiny, the limb flat, spreading, purple-browu, somewhat 3-lobed; anthers contiguous in pairs under the 3 lobes of the stigma; capsule oblong-cylindric, strougly parallel-nerved, 2′–3′ long, 8″–10″ in diameter.

In rich woods, southern Pennsylvania to Minnesota, Georgia, Tennessee and Kansas. Ascends to 4500 ft. in Virginia. May–June. Fruit ripe Sept.

4. Aristolochia tomentòsa Sims. Woolly Pipe-vine. (Fig. 1284.)

A. tomentosa Sims, Bot. Mag. *pl. 1369.* 1811.

A twining vine, similar to the preceding, but the twigs, petioles, leaves and peduncles persistently tomentose. Leaves suborbicular or broadly ovate, obtuse or rounded at the apex, 3′–6′ broad when mature; petioles rather stout, 1′–3′ long; peduncles axillary, mostly solitary, slender, bractless; calyx densely tomentose, the tube sharply curved, yellowish green, about 1½′ long, its throat nearly closed, the limb becoming reflexed, wrinkled, dark purple, 3-lobed; anthers contiguous in pairs beneath the 3 spreading lobes of the stigma; capsule oblong-cylindric.

In woods, Missouri and southern Illinois to North Carolina, Alabama and Florida. May–June.

Family 14. **POLYGONÀCEAE** Lindl. Nat. Syst. Ed. 2, 211. 1836.*

Buckwheat Family.

Herbs, twining vines, shrubs or trees, with alternate or sometimes opposite or whorled simple mostly entire leaves, jointed stems, and usually sheathing united stipules (ocreae). Flowers small, regular, perfect, dioecious, monoecious or polygamous, spicate, racemose, corymbose, umbellate or panicled. Petals none. Calyx inferior, free from the ovary, 2–6-cleft or 2–6-parted, the segments or sepals more or less imbricated, sometimes petaloid, sometimes developing wings in fruit. Stamens 2–9, inserted near the base of the calyx, or in staminate flowers crowded toward the centre; filaments filiform or subulate, often dilated at the base, distinct or united into a ring; anthers 2-celled, the sacs longitudinally dehiscent. Pistil solitary; ovary superior, 1-celled; ovule solitary, orthotropous, erect or pendulous; style 2–3-cleft or 2–3-parted (rarely 4-parted), sometimes very short; stigmas capitate or tufted, rarely 2-cleft; fruit a lenticular 3-angled or rarely 4-angled achene, usually invested by the persistent calyx; seed shaped like the pericarp; endosperm mealy; cotyledons accumbent or incumbent, flat; embryo straight or curved.

About 30 genera and 800 species, of wide geographic distribution.

Flowers subtended by involucres.
- Ocreae present; calyx 2–4-parted; stamens 3 or fewer. 1. *Macounastrum.*
- Ocreae none; calyx 6-cleft or 6-parted; stamens 9; achene 3-angled. 2. *Eriogonum.*

Flowers not involucrate; stamens 4–8.
- Ocreae present; stigmas tufted.
  - Calyx 6-parted; style 3-parted; achene 3-angled. 3. *Rumex.*
  - Calyx 4-parted; style 2-parted; achene lenticular. 4. *Oxyria.*
- Ocreae present; stigmas capitate.
  - Pedicels mostly several together; achene much surpassing the calyx. 5. *Fagopyrum.*
  - Pedicels usually fascicled; achene mostly enclosed by the enlarged calyx. 6. *Polygonum.*
  - Pedicels solitary; leaves jointed at the base. 7. *Polygonella.*
- Ocreae obscure or wanting; stigmas 2-cleft. 8. *Brunnichia.*

1. MACOUNÁSTRUM Small.

[Koenigia L. Mant. 35. 1767. Not *Konig* Adans. 1763.]

Low glabrous annual herbs, with fibrous roots, erect or spreading simple or forked stems, alternate or opposite entire leaves, funnelform membranous ocreae, and minute perfect terminal clustered flowers, subtended by a several-leaved involucre. Calyx 2–4-parted (usually 3-parted), greenish-white, the segments valvate, equal; pedicels short, subtended by transparent bracts; stamens 2 or 4, alternate with and often protruding between the calyx-segments; filaments short, stout; anthers ovoid. Style 2–3-parted; stigmas capitate; achene ovoid, 3-angled or lenticular, exceeding the persistent calyx; embryo eccentric, accumbent.

Two or three species, the following circumboreal, the others of the higher Himalayas.

* Text contributed by Dr. John K. Small.

1. Macounastrum Islándicum (L.) Small. Macounastrum. (Fig. 1285.)

Koenigia Islandica L. Mant. 35. 1767.

Stems very slender, 1′–4′ long, sometimes tufted. Leaves obovate, oblong or almost orbicular, 1″–5″ long, fleshy, obtuse at the apex, sessile or short-petioled; ocreae about ½″ long; involucre consisting of 3-6 obovate or orbicular leaves more or less united at their bases; flowers fascicled in the involucres, short-pedicelled; calyx ½″ long, the segments ovate-lanceolate, rather obtuse; stamens very short; style-branches short; achene less than 1″ long, brown, often slightly curved, striate, its faces convex.

Greenland and Labrador to Hudson Bay and Alaska. Also in arctic Europe and Asia. Summer.

2. ERIÓGONUM Michx. Fl. Bor. Am. 1: 246. 1803.

Annual or perennial acaulescent or leafy-stemmed herbs, some species very woody at the base, with simple or branched, often tufted stems, and entire alternate opposite or whorled leaves. Flowers small, fascicled, cymose, umbellate or capitate, subtended by 5–8-toothed or cleft campanulate top-shaped or almost cylindric involucres. Calyx 6-cleft or 6-parted, usually colored, the segments equal or the outer ones larger. Stamens 9, included or exserted; filaments filiform, often villous; anthers oblong. Style 3-parted; stigmas capitate. Achene pyramidal, 3-angled, more or less swollen near the base, invested by the calyx-segments, or winged. Embryo axial or somewhat eccentric. [Greek, referring to the woolly and jointed stems.]

About 160 species, natives of America, mostly of the western United States.

Stem leafy to the summit.
- Stem leaves alternate; stem strigose.
  - Achene glabrous, winged in fruit. — 1. *E. alatum.*
  - Achene villous, not winged — 2. *E. longifolium.*
- Stem leaves whorled; stem tomentose.
  - Robust; basal leaves rounded at the base; flowers yellow. — 3. *E. Alleni.*
  - Slender; basal leaves narrowed at the base; flowers white or pink. — 4. *E. Jamesii.*

Stem leafy below, naked above.
- Involucres erect on branches of the cymes. — 5. *E. annuum.*
- Involucres in axillary and terminal clusters.
  - Leaves narrowly oblong or oblanceolate, flat, long-petioled. — 6. *E. microthecum.*
  - Leaves oblong, more or less crisped, short-petioled. — 7. *E. corymbosum.*

Acaulescent; scapose; scapes more or less tufted.
- Scape simple; inflorescence capitate.
  - Densely tomentose; leaves spatulate, numerous. — 8. *E. multiceps.*
  - Slightly tomentose; leaves linear or linear-spatulate, few. — 9. *E. pauciflorum.*
- Scape branched at the summit.
  - Inflorescence regularly umbellate. — 10. *E. flavum.*
  - Inflorescence irregularly umbellate or paniculate. — 11. *E. lachnogynum.*
  - Inflorescence cymose. — 12. *E. campanulatum.*
- Scape branched throughout; involucres solitary on deflexed peduncles. — 13. *E. cernuum.*

1. Eriogonum alàtum Torr. Winged Eriogonum. (Fig. 1286.)

E. alatum Torr. Sitgreaves' Rep. 168. *pl. 8.* 1853.

Perennial by a long thick root, stem rather stout, erect, strigose, paniculately branched, somewhat angled, 1°–3° tall. Leaves mostly basal, spatulate, oblanceolate or narrowly obovate, 1′–3′ long, those of the stem alternate, nearly linear, short-petioled, all obtuse or subacute at the apex, glabrous or pubescent and with midrib prominent beneath, ciliate; panicle open; bracts lanceolate or subulate; involucres cymose at the ends of the branches, campanulate, 5-toothed, 1″–1½″ long, the segments obtuse and somewhat reflexed; calyx yellowish, 1″ long, campanulate; stamens slightly exserted; achene long-pointed, 2½″–3″ long, reticulated, closely invested by 3 wings.

On plains, western Nebraska to Texas, west to Colorado and New Mexico. June–Sept.

2. Eriogonum longifòlium Nutt. Long-leaved Eriogonum. (Fig. 1287.)

Eriogonum longifolium Nutt. Trans. Am. Phil. Soc. (II.) 5: 164. 1833–37.
E. Texanum Scheele, Linnaea, 22: 150. 1849.

Perennial, strigose throughout, stem stout, erect, paniculately or corymbosely branched, leafy, finely grooved, 2°–4° tall. Leaves narrowly oblong or linear-oblong, obtuse at the apex, more or less tomentose beneath, the upper sessile, the lower narrowed into petioles with dilated and sheathing bases; bracts lanceolate or subulate; involucres turbinate-campanulate, 1½″–2″ long; peduncles 1′ long or less; calyx oblong-campanulate, 2″–3″ high, 6-parted to near the base, very villous; stamens and style-branches exserted; achene 2½″ long, much enlarged at the base, villous, loosely invested by the calyx-segments, not winged.

Southern Missouri to Texas. Also in Florida. June–Nov.

3. Eriogonum Álleni S. Wats. Allen's Eriogonum. (Fig. 1288.)

E. Alleni S. Wats. in A. Gray, Man. Ed. 6, 734. 1890.

Perennial, floccose-tomentose throughout, stem rather stout, erect, sparingly branched above, 1°–1½° tall. Leaves oblong, or ovate-oblong, 1′–3′ long, the basal long-petioled, obtuse at both ends, those of the stem in whorls of 3–5 at the somewhat swollen nodes, short-petioled, narrowed at the base, the upper small and bract-like; inflorescence compoundly cymose; involucres top-shaped, 5-toothed, 2½″–3″ long, the teeth obtusish; bracts leaf-like, spatulate; calyx yellow, 1½″ long, broadly campanulate, its segments obovate or orbicular; stamens and style-branches exserted.

White Sulphur Springs, West Virginia. July–Aug.

4. Eriogonum Jàmesii Benth. James' Eriogonum. (Fig. 1289.)

Eriogonum Jamesii Benth. in DC. Prodr. 14: 7. 1856.
Eriogonum sericeum Torr.; T. & G. Proc. Am. Acad. 8: 155. 1870. Not Pursh, 1814.

Perennial, base woody, scaly, somewhat branched, stem usually spreading, branched, tomentose, slender, 6′–18′ long, the branches erect, 3 or 4 times forked, light brown or reddish. Leaves mostly basal, spatulate or oblong, 1′–4′ long, long-petioled, the upper smaller, sessile in whorls of 3 or 4 at the somewhat swollen nodes, all obtuse or subacute, dark green and sparingly tomentose above, densely gray-tomentose beneath, their margins sometimes slightly revolute and crisped; inflorescence compoundly cymose; involucres turbinate-campanulate, 2″ long, 5-toothed, the teeth rounded; bracts foliaceous, narrowly oblong or oblong-spatulate; calyx white or pink, campanulate, villous, 2½″–3″ long, its segments oblong or obovate; stamens and style-branches exserted; achene 2½″–3″ long, smooth, villous near the apex, its angles margined.

On plains, Kansas (?), Colorado to Texas, Arizona and Chihuahua. July–Oct.

5. Eriogonum ánnuum Nutt. Annual Eriogonum. (Fig. 1290.)

Eriogonum annuum Nutt. Trans. Am. Phil. Soc. (II.) 5: 164. 1833–37.
E. Lindheimerianum Schcele, Linnaea, 22: 149. 1849.

Annual, white floccose-tomentose throughout, simple or branched, leafy below, naked above, 1°–3° tall. Leaves oblong, oblong-lanceolate or oblanceolate, acute or obtuse at the apex, narrowed or acuminate at the base, petioled, the margins somewhat revolute or crisped; inflorescence cymose; involucres top-shaped, 1″–1½″ long, secund, erect, 5-toothed, the teeth obtuse; bracts triangular, not foliaceous; calyx white or whitish, ½″–1″ long, campanulate, 6-cleft to beyond the middle, the lobes obovate; achene pointed, less than 1″ long, its angles smooth, its base almost globular.

On plains, Nebraska to Texas, west to New Mexico, extending into Mexico. July–Sept.

6. Eriogonum microthècum Nutt. Slender Eriogonum. (Fig. 1291.)

Eriogonum microthecum Nutt. Journ. Acad. Phila. (II.) 1: 172. 1848.

Perennial, woody, especially below, more or less floccose-tomentose throughout; stem erect or ascending, branched, especially from the base, leafy below, naked above, 6′–12′ high. Leaves oblong or oblanceolate, obtuse at the apex, narrowed into short petioles, ½′–2′ long, the upper bract-like; inflorescence compoundly cymose; involucres top-shaped, 1½″ long, 5-toothed, the teeth obtusish; bracts triangular; calyx yellow, white or pink, 1½″ long, campanulate, at length constricted near the middle; stamens and style-branches included; achene pointed, 1″ long, rough on the angles.

Western Nebraska to Washington, south to New Mexico and California. July–Oct.

Eriogonum microthècum effùsum (Nutt.) T. & G. Proc. Am. Acad. 8: 172. 1870.
Eriogonum effusum Nutt. Journ. Acad. Phila. (II.) 1: 164. 1848.

More densely floccose-tomentose; stem diffusely branched; leaves linear-oblong or linear; inflorescence 2–3 times compound, elongated; flowers white. Nebraska to Montana and New Mexico.

7. Eriogonum corymbòsum Benth. Crisp-leaved Eriogonum. (Fig. 1292.)

E. corymbosum Benth. in DC. Prodr. 14: 17. 1856.

Perennial, woody, densely floccose-tomentose throughout; stem erect, branched, leafy below, naked above, 6′–12′ tall. Leaves oblong, obtuse at the apex, narrowed at the base, petioled, ½′–1½′ long, their margins more or less crisped; inflorescence compoundly cymose; involucres short-campanulate, 5-toothed, about 1½″ long, the teeth subacute; bracts triangular or triangular-lanceolate, not foliaceous; calyx broadly campanulate, 1″–1½″ long, constricted near the middle, 6-cleft, the segments fiddle-shaped, emarginate, the 3 inner ones shorter than the outer; style-branches exserted; achene 1″ long, enlarged at the base, rough on the angles.

Kansas to New Mexico, west to Utah and Arizona. Aug.–Sept.

8. Eriogonum múlticeps Nees. Branched Eriogonum. (Fig. 1293.)

E. multiceps Nees, Max. Reise N. A. 2: 446. 1841.
E. gnaphaloides Benth. Kew Journ. Bot. 5: 263. 1853.

Perennial by a slender root, scapose, densely white-tomentose throughout; stems short, tufted, much branched, sometimes several inches long. Scapes simple, 1′–5′ high; leaves spatulate, ½′–2′ long, numerous, obtuse at the apex, narrowed below into petioles; inflorescence capitate; involucres 3–12, sessile, 1½″ long, 5–6-toothed, the teeth acute; bracts foliaceous, spatulate; calyx white or rose-color, 1½″–2½″ long, campanulate, somewhat villous, 6-cleft to about the middle, the segments cuneate, obtuse or emarginate; stamens and style-branches exserted; achene ½″ long.

On dry plains, Nebraska and Colorado. June–Aug.

9. Eriogonum pauciflòrum Pursh. Few-flowered Eriogonum. (Fig. 1294.)

E. pauciflorum Pursh, Fl. Am. Sept. 735. 1814.
Eriogonum parviflorum Nutt. Gen. 1: 261. 1818.

Perennial, root long and slender, stems very short, simple or sparingly branched, loosely tufted, covered by the scarious dilated bases of the petioles. Scapes erect, slender, simple, slightly tomentose, 2′–6′ high; leaves linear or linear-spatulate, 1′–3′ long, rather obtuse, but apparently acute from the strongly revolute margins, glabrous or sparingly pubescent above, white-tomentose or cottony beneath, narrowed into slender petioles; inflorescence capitate; involucres 4–10, 1½″ long, turbinate-campanulate, 5-toothed, the teeth obtuse, more or less reflexed; calyx white, campanulate, 1½″ long, glabrous, the segments ovate; achene 1¼″ long, its faces swollen at about the middle, inconspicuously striate-reticulated.

On dry plains, Nebraska and Colorado. July–Sept.

10. Eriogonum flàvum Nutt. Yellow Eriogonum. (Fig. 1295.)

Eriogonum flavum Nutt. Fras. Cat. 1813.
E. sericeum Pursh, Fl. Am. Sept. 277. 1814.

Perennial, scapose, white-tomentose throughout, root short, scaly, spindle-shaped, stem very short and thick, simple and solitary or tufted and creeping, woody. Scapes 2′–12′ tall, erect; leaves crowded on the short stem, linear-oblong or oblong-spatulate, 1′–3′ long, mostly obtuse at the apex, flat, narrowed into petioles; petioles dilated at the base and imbricated; inflorescence regularly umbellate; involucres top-shaped, 2″–2½″ long, nearly entire, rather densely clustered; peduncles ¼′–1½′ long; bracts spatulate, foliaceous; calyx yellow, 3″ high, top-shaped, very villous, the segments obovate; stamens and style-branches exserted; achene constricted at the middle, 2″ long, villous at the summit, the angles undulate, the faces swollen.

Nebraska and Kansas to the Northwest Territory and Arizona. June–Sept.

11. Eriogonum lachnogynum Torr. Long-rooted Eriogonum. (Fig. 1296.)

Eriogonum lachnogynum Torr.; Benth. in DC. Prodr. 14: 8. 1856.

Perennial, scapose, root long, fusiform, stems stout and short, tufted, much branched, covered with the dilated petiole-bases. Scape erect, slender, 4′–12′ tall, white-tomentose, sparingly branched above; leaves numerous, crowded, lanceolate or narrowly oblong, ½′–1′ long, acute at the apex, narrowed at the base, silky above, white-tomentose beneath, long-petioled, their margins somewhat revolute; inflorescence irregularly umbellate or paniculate; involucres broadly campanulate or nearly hemispheric, 1½″–2″ high, sessile or peduncled, 5-toothed, teeth obtuse; bracts small, lanceolate; calyx campanulate, 1½″ long, villous; stamens and style-branches exserted.

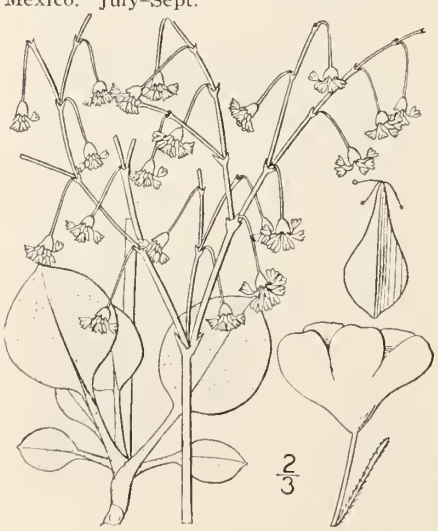
Western Kansas to Colorado and Arizona. May–Nov.

12. Eriogonum campanulàtum Nutt. Narrow-leaved Eriogonum. (Fig. 1297.)

Eriogonum campanulatum Nutt. Journ. Acad. Phila. (II.) 1: 163. 1848.
Eriogonum breviçaule Nutt. Journ. Acad. Phila. (II.) 1: 163. 1848.
Eriogonum micranthum Nutt. Journ. Acad. Phila. (II.) 1: 164. 1848.

Perennial, scapose, stem short, thick and woody, more or less tomentose; scapes erect or nearly so, glabrous, 4′–12′ tall; leaves crowded, narrowly oblanceolate, spatulate or nearly linear, 1′–3′ long, obtuse at the apex, narrowed into long petioles, white-tomentose on both sides, the margins sometimes revolute; inflorescence compoundly cymose; involucres oblong-turbinate, 1″ long, 5-toothed, teeth obtuse; bracts triangular, not foliaceous; calyx yellow, ovoid-campanulate, about 1″ long, 6-cleft, the lobes oblong or fiddle-shaped, emarginate; stamens and style-branches exserted; achene 1½″ long, enlarged at base.

Nebraska to Oregon, south to Utah and New Mexico. July–Sept.



13. Eriogonum cérnuum Nutt. Nodding Eriogonum. (Fig. 1298.)

E. cernuum Nutt. J. Acad. Phila. (II.) 1: 162. 1848.

Annual, low, stem very short; scape erect, usually much branched, 6′–12′ high. Leaves confined to the short stem, orbicular or oblong-orbicular, less than 1′ long, obtuse or slightly apiculate, flat, floccose-tomentose, especially beneath, petioled; inflorescence paniculate; involucres campanulate, slightly more than ½″ long, solitary on slender deflexed peduncles 1′ long or less, 5-cleft to near the middle, the lobes obtuse; bracts triangular or lanceolate, not foliaceous; calyx whitish, campanulate, ½″ long, 6-parted, slightly constricted near the summit, the segments fiddle-shaped; stamens and style-branches included; achene ½″ long, nearly globular at the base, rough on the angles.

Nebraska to New Mexico and Utah. July–Sept.

3. RÙMEX L. Sp. Pl. 333. 1753.

Perennial or annual, leafy-stemmed herbs, some species slightly woody, the leaves in some mainly basal. Stem grooved, mostly branched, erect, spreading or creeping. Leaves entire or undulate, flat or crisped, the ocreae usually cylindric, brittle and fugacious, the inflorescence consisting of simple or compound, often panicled racemes. Flowers green, perfect, dioecious, or polygamo-monoecious, whorled, on jointed pedicels. Corolla none. Calyx 6-parted, the 3 outer sepals unchanged in fruit, the 3 inner ones mostly developed into wings, one or all three of which usually bears a callosity (tubercle); wings entire, dentate, or fringed with bristle-like teeth. Stamens 6, included or exserted; filaments very short, glabrous; anthers oblong. Style 3-parted; stigmas peltate, tufted; achene 3-angled, the angles more or less margined. Embryo curved or nearly straight, borne in one of the faces of the 3-angled seed. [The ancient Latin name.]

About 130 species, of wide geographic distribution. Besides the following, some 6 others occur in the southern and western parts of North America.

* Leaves hastate; flowers dioecious; foliage acid; low species.

Inner sepals not developing wings in fruit; achene granular. 1. *R. Acetosella.*
Fruiting inner sepals developing wings; achene smooth.
  Basal leaves numerous; wings orbicular-cordate. 2. *R. hastatulus.*
  Basal leaves few; wings broadly oblong-cordate. 3. *R. Acetosa.*

** Leaves not hastate; flowers perfect or polygamo-dioecious; foliage scarcely or not at all acid; tall species.

Leaves flat, bright or light green, or glaucescent.
  Wings ½′–1½′ broad, reddish; no tubercles. 4. *R. venosus.*
  Wings small, not red, bearing tubercles.
    Tubercles usually 3.
      Pedicels little longer than the wings. 5. *R. salicifolius.*
      Pedicels several times longer than the wings. 6. *R. verticillatus.*
    Tubercle usually 1; pedicels equalling the wings. 7. *R. altissimus.*
Leaves wavy-margined or crisped, dark green, not glaucescent.
  Wings entire, more or less undulate.
    Lower leaves narrowed or acuminate at the base.
      Tubercle 1. 8. *R. Patientia.*
      Tubercles 3. 9. *R. Britannica.*
    Lower leaves cordate or rounded at the base.
      Tubercles wanting. 10. *R. occidentalis.*
      Tubercles mostly 3.
        Inflorescence not leafy; pedicels long. 11. *R. crispus.*
        Inflorescence leafy; pedicels short. 12. *R. conglomeratus.*
      Tubercle 1; inflorescence not leafy; pedicels short. 13. *R. sanguineus.*
  Wings toothed or fringed.
    Lower leaves cordate.
      Wings ovate or oblong-ovate; tubercles mostly 2. 14. *R. pulcher.*
      Wings hastate or ovate-hastate; tubercle 1. 15. *R. obtusifolius.*
    Lower leaves mostly narrowed at base; wings with 4 spreading bristle-like teeth. 16. *R. persicarioides.*

1. Rumex Acetosélla L. Field or Sheep Sorrel. (Fig. 1299.)

Rumex Acetosella L. Sp. Pl. 338. 1753.

Annual or perennial, glabrous, dioecious, stem slender, erect or nearly so, simple or branched, the rootstock woody, horizontal or creeping. Leaves narrowly hastate, 1′–4′ long, obtuse or acute at the apex, usually widest above the middle, petioled, the basal auricles entire or 1–2-toothed, or the uppermost leaves nearly linear and not auricled, all papillose; ocreae silvery, 2-parted, soon lacerate; flowers in erect panicled racemes; racemes interrupted; calyx green, ½″ long, pedicelled; stamens exserted; achene less than 1″ long, very granular, exceeding the persistent calyx, its angles not margined.

In dry fields and on hillsides throughout North America except the extreme north. In large part naturalized from Europe. Sometimes a troublesome weed. Foliage very acid. Native also of Asia. Ascends to 6000 ft. in North Carolina. May–Sept.

2. Rumex hastátulus Muhl. Engelmann's Sorrel. (Fig. 1300.)

Rumex hastatulus Muhl. Cat. Ed. 2, 37. 1818.
R. Engelmanni Meisn. in DC. Prodr. **14**: 64. 1856.

Perennial from a woody base, glabrous, dioecious; stem rather strict, simple or branched, erect, 5′–20′ tall. Leaves hastate, oblong or oblanceolate, 1′–5′ long, the basal numerous, more or less auricled at the base, subacute, petioled, those of the stem linear, all papillose; ocreae silvery, 2-parted, at length lacerate; racemes ascending, at length interrupted; calyx green, slender-pedicelled, winged in fruit; pedicels equalling or longer than the wings; wings orbicular, mostly broader than high, cordate, 1¼″–1¾″ long; stamens slightly exserted; achene reddish, smooth, shining, less than 1″ long, invested by the calyx-wings, its angles margined.

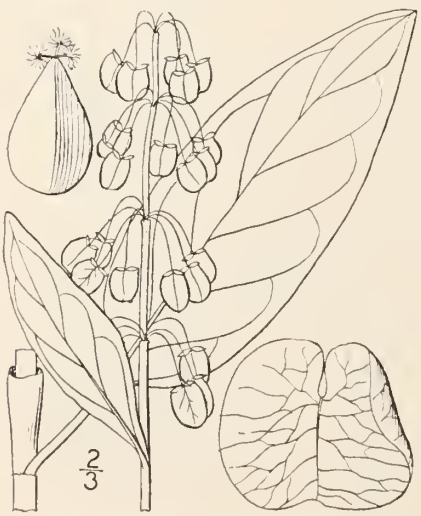
On the sea-coast, southern New York to Florida and on the plains from Kansas to Texas, a geographic distribution nearly the same as that of *Chenopodium leptophyllum*. March–Aug.

3. Rumex Acetòsa L. Sorrel. Sour Dock. (Fig. 1301.)

Rumex Acetosa L. Sp. Pl. 337. 1753.

Perennial, glabrous, dioecious; stem erect, simple, grooved, 1°–3° tall. Leaves oblong-hastate or ovate-sagittate, 1′–5′ long, acute at the apex, crisped or erose on the margins, the basal few, long-petioled, the upper subsessile, the acute auricles entire or 1-toothed and more or less reflexed; ocreae lacerate; racemes nearly erect, crowded, at length interrupted; calyx green, 1″ long, pedicelled, winged in fruit; pedicels equalling or shorter than the wings, jointed near the middle; wings broadly ovate or orbicular, cordate, 2″–2½″ long; achene rather more than 1″ long, pointed, smooth, shining, blackish, invested by the calyx-wings.

Labrador to Alaska. Naturalized from Europe in Vermont, New York and Pennsylvania. Native also of Asia. Summer.



4. Rumex venòsus Pursh. Veined Dock. (Fig. 1302.)

Rumex venosus Pursh, Fl. Am. Sept. 733. 1814.

Perennial by a woody rootstock, glabrous, stem rather stout, erect, somewhat flexuous, 6′–15′ tall, grooved, branched. Leaves ovate, ovate-lanceolate or oblong, 1′–5′ long, acute at both ends or acuminate at the base, petioled, rather coriaceous; ocreae funnelform, thin, brittle; racemes mostly erect, soon interrupted; calyx red, pedicelled, very conspicuously winged in fruit; pedicels at maturity rather stout, slightly shorter than the wings, jointed at about the middle; wings large, ½′–1½′ broad, suborbicular with a deep sinus at the base, veiny, reddish; style-branches divergent in fruit; achene 3″ long, smooth, shining, its faces concave, its angles margined.

Northwest Territory to Oregon and Washington, south to Missouri and Nevada. May–Aug.

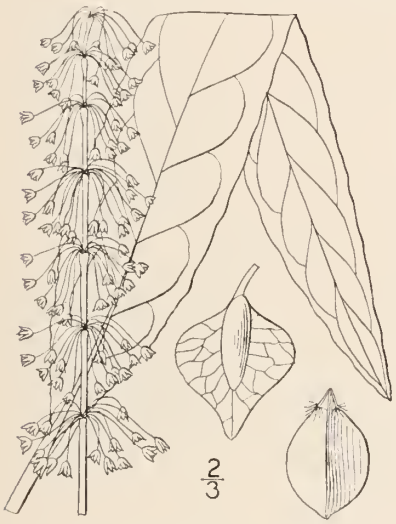
5. Rumex salicifòlius Weinm. White, Pale or Willow-leaved Dock. (Fig. 1303.)

Rumex salicifolius Weinm. Flora, 4: 28. 1821.

Perennial, glabrous, pale green; stem erect, ascending, or sometimes spreading, simple or branched, grooved, flexuous, 1°–3° high. Leaves lanceolate, linear-lanceolate or the lower oblong, acute or acuminate at both ends, or rarely obtuse at the apex, petioled; racemes erect, divergent or reflexed, dense, in fruit interrupted below; flowers in dense clusters; calyx pale green, 1″ long, pedicelled, winged in fruit; pedicels slightly longer than the wings, jointed near the base; wings triangular-ovate, 1½″ long, undulate or subdentate, each bearing a large ovoid tubercle; achene 1″ long, dark red, smooth, shining, its faces concave, its angles slightly margined.

In swamps, Labrador to southern New York, Florida, Texas and Lower California. Also in Europe. May–Sept.

6. Rumex verticillàtus L. Swamp Dock. (Fig. 1304.)



Rumex verticillatus L. Sp. Pl. 334. 1753.

Perennial, glabrous, rather bright green; stem stout, grooved, simple or nearly so, erect, ascending or decumbent, 2°–5° long, more or less flexuous when old. Leaves narrowly oblong, oblong-lanceolate or lanceolate, 2′–12′ long, narrowed at both ends or obtusish at the apex, slightly papillose, long-petioled; racemes interrupted below, spreading in fruit; flowers in rather dense whorls; calyx green, 1″ long, winged in fruit; pedicels stout, thickened above, jointed near the base, 3–5 times as long as the wings; wings broadly deltoid, 2″ long, more or less decurrent on the pedicel, each bearing a narrowly ovoid tubercle; style-branches reflexed in fruit; achene 1¼″ long, reddish, pointed, smooth, shining, its faces concave.

In swamps, Quebec to Ontario and Iowa, south to Florida and Texas. May–July.

7. Rumex altíssimus Wood. Tall or Peach-leaved Dock. (Fig. 1305.)

Rumex altissimus Wood, Class-book, 477. 1853.
Rumex Britannica Meisn. in DC. Prodr. 14: 47. 1856. Not L. 1753.

Perennial, glabrous, rather pale green; stem stout, erect, simple or sparingly branched above, grooved, 2°–4° tall. Leaves lanceolate, oblong-lanceolate or ovate-lanceolate (sometimes oblanceolate) 2′–10′ long, acute at both ends, papillose; panicle rather open; racemes slightly interrupted in fruit; flowers densely whorled; calyx light green, 1″ long, winged in fruit; pedicels slender, jointed near the base, as long as the wings; wings triangular-cordate, 2″–2½″ long, usually one of them only bearing an ovoid tubercle; achene 1½″ long, dark red, smooth, shining, its faces concave.

Along streams and in swamps, Massachusetts to Nebraska, Maryland and Texas. April–June.

8. Rumex Patiéntia L. Patience Dock. (Fig. 1306.)

Rumex Patientia L. Sp. Pl. 333. 1753.

Perennial, glabrous, stem erect, simple or sparingly branched, grooved, 2°–5° tall. Lower leaves ovate-lanceolate, long-petioled, 4′–16′ long, the upper oblong-lanceolate or oblong-elliptic, acute or obtusish, the uppermost lanceolate; fruiting panicle dense; racemes erect, somewhat interrupted in fruit; flowers densely whorled; calyx green; pedicels slender, 2–4 times as long as the calyx-wings, jointed below the middle; wings orbicular-cordate, 2″–3″ long, one of them bearing a prominent ovoid callosity; achene 1½″ long, light brown, smooth, shining, its faces concave, its angles obscurely margined.

In waste places, Vermont and Ontario to Wisconsin, Pennsylvania and Kansas. Also in the Far West. Naturalized from Europe. May–June.

9. Rumex Británnica L. Great Water-Dock. (Fig. 1307.)

Rumex Britannica L. Sp. Pl. 334. 1753.
Rumex Hydrolapathum var.? *Americanum* A. Gray, Man. Ed. 2, 377. 1856.
R. orbiculatus A. Gray, Man. Ed. 5, 420. 1867.

Perennial, glabrous, dark green, stem stout, erect, more or less branched, grooved, 3°–6° tall. Leaves lanceolate or oblong-lanceolate, the lower 1°–2° long, long-petioled, the upper 2′–6′ long, short-petioled; fruiting panicle dense; racemes nearly erect, more or less interrupted; flowers densely whorled; calyx light green; pedicels slender, conspicuously jointed above the base, ½–2 times as long the calyx-wings; wings broadly cordate, 3″ long, irregularly denticulate, each bearing a large callosity; achene ovoid-oblong, or oblong, 2″ long, pointed at both ends, brown, smooth, shining, its faces concave, its angles slightly margined.

In swamps and wet soil, New Brunswick and Ontario to Minnesota, New Jersey, Pennsylvania, Illinois and Iowa. July–Aug.

10. Rumex occidentàlis S. Wats. Western Dock. (Fig. 1308.)

R. occidentalis S. Wats. Proc. Am. Acad. 12: 253. 1876.

Perennial, glabrous, stem stout, strict, erect or nearly so, strongly grooved, simple or sparingly branched, 2°–3° high. Leaves lanceolate or ovate-lanceolate, bluish-green, somewhat crisped and wavy-margined, papillose, the lower 8′–12′ long, obtuse or subacute at the apex, more or less cordate at the base, long-petioled, the upper smaller and usually lanceolate; panicle rather dense, leafless or nearly so, erect; racemes usually not interrupted; flowers loosely whorled; calyx pale green, 1″ long; pedicels obscurely jointed below the middle, 2–3 times longer than the calyx-wings; wings triangular-ovate, 2½″–4″ long, somewhat dentate or undulate, bearing no tubercles; achene oblong, 2″–2½″ long, short-pointed, chestnut-brown, smooth, shining.

In wet places, Labrador to Alaska, Ontario, Rocky Mountains to Texas, and to California. May–Aug.

11. Rumex crispus L. Curled Dock. (Fig. 1309.)

Rumex crispus L. Sp. Pl. 335. 1753.

Perennial, glabrous, dark green; stem rather slender, erect, simple or branched above, grooved, 1°–3½° tall. Leaves crisped and wavy-margined, the lower oblong or oblong-lanceolate, 6′–12′ long, long-petioled, the upper narrowly oblong or lanceolate, 3′–6′ long, short-petioled, all cordate or obtuse at the base, more or less papillose; panicle rather open; racemes simple or compound, by the elongation of the pedicels apparently continuous in fruit; flowers rather loosely whorled; calyx dark green; fruiting pedicels 1½–2 times as long as the calyx-wings, jointed near the base; wings cordate, 1½″–2″ long, truncate or notched at base, erose-dentate, or nearly entire, each bearing a tubercle; achene 1″ long, dark brown, shining.

In fields and waste places nearly throughout the United States and southern British America. Often a troublesome weed. Naturalized from Europe. Native also of Asia. June–Aug.

12. Rumex conglomerâtus Murr. Clustered or Smaller Green Dock. (Fig. 1310.)

R. conglomeratus Murr. Prodr. Fl. Goett. 52. 1770.

Perennial, glabrous, pale green; stem slender, erect, simple or branched, grooved, 1°–3° tall. Leaves ovate, oblong or lanceolate, 1′–5′ long, some of them slightly fiddle-shaped, acute at the apex, obtuse at the base, crenulate and slightly crisped on the margins, petioled; panicle loose and open in fruit; racemes leafy, slender, ascending, much interrupted; flowers loosely whorled; calyx small, green; pedicels shorter than or equalling the calyx-wings, jointed near the base; wings ovate, fiddle-shaped, 1½″ long, toothed near the base, each bearing a large oblong callosity; achene less than 1″ long, pointed, red, smooth, shining, its faces convex.

In waste places, Virginia to South Carolina. Also in California. Naturalized from Europe. May–July.

13. Rumex sanguíneus L. Bloody or Red-veined Dock. (Fig. 1311.)

Rumex sanguineus L. Sp. Pl. 334. 1753.

Perennial, glabrous, stem slender, erect, grooved, simple or branched, 1°–3° high. Leaves oblong, oblong-lanceolate or lanceolate, 1′–6′ long, the lower long-petioled, cordate at the base, acute or obtuse at the apex, usually red-veined, the upper short-petioled; panicle loose; racemes slender, spreading, not leafy, interrupted; flowers loosely whorled; calyx very small; pedicels slender, 1–1½ times as long as the calyx-wings, jointed at the base; wings oblong, 1½″ long, one of them bearing a spherical-oblong callosity; achene less than 1″ long, sharp-pointed, dark red, smooth, shining, its faces convex.

In waste places and ballast, southern New York to Virginia and Louisiana. Uncommon. Naturalized or adventive from Europe. May–Aug.

14. Rumex púlcher L. Fiddle Dock. (Fig. 1312.)

Rumex pulcher L. Sp. Pl. 336. 1753.

Perennial, dark green; stem slender, erect or procumbent, grooved, diffusely branched, 1°–3° long, the branches spreading. Leaves oblong, or some of the lower fiddle-shaped, 1′–6′ long, long-petioled, obtuse at the apex, cordate at the base; upper oblong or oblong-lanceolate, 1′–3′ long, short-petioled, usually narrowed at both ends; petioles more or less pubescent; panicle loose; racemes long, divergent, sometimes reflexed, much interrupted, rather leafy; flowers few in the whorls; calyx very small, green; pedicels equalling the calyx-wings, jointed at or below the middle; wings ovate or oblong-ovate, 2″ long, truncate at the base, one larger than the others or all three of different sizes, fringed with spine-like teeth, usually two, sometimes one or all three bearing tubercles; achene 1″ long, pointed, reddish, smooth, shining, its faces concave.

In waste places, Virginia to Florida and Louisiana. Also on the Pacific Coast and in ballast about the northern seaports. Naturalized from Europe. June–Sept.

15. Rumex obtusifòlius L. Broad-leaved or Bitter Dock. (Fig. 1313.)

Rumex obtusifolius L. Sp. Pl. 335. 1753.

Perennial, glabrous, dark green; stem stout, erect, simple or sparingly branched, grooved, more or less scurfy above, 2°–4° tall. Lower leaves oblong-lanceolate, 6′–14′ long, long-petioled, all cordate or rounded at the base, obtuse or acute at the apex, the upper lanceolate or oblong-lanceolate, 2′–6′ long, short-petioled, the margins somewhat undulate or crisped; panicle rather open; racemes nearly erect, continuous or interrupted below; flowers loosely whorled; pedicels slender, somewhat longer than the calyx-wings, jointed below the middle; wings hastate, 2″–2½″ long, fringed with a few spreading spiny teeth, one of them bearing an oblong tubercle; achene 1″ long, pointed, dark red, smooth, shining, its faces concave, its angles slightly margined.

In waste places, Nova Scotia and New Brunswick to Oregon, south to Florida and Texas. Naturalized from Europe. Native also of Asia. June–Aug.

16. Rumex persicarioìdes L. Golden Dock. (Fig. 1314.)

Rumex persicarioides L. Sp. Pl. 335. 1753.

Annual, pubescent, pale green; stem rather stout, erect and simple, or diffusely branched, 1°–3° high, or sometimes spreading or creeping, very leafy. Leaves lanceolate, or oblong, 1′–12′ long, narrowed at the base, or sometimes cordate, or sagittate, acute at the apex, the margins undulate and more or less crisped; panicle simple or compound; racemes erect, leafy-bracted, mostly interrupted; flowers densely whorled; pedicels slender, 1–1½ times as long as the calyx-wings, jointed at the base; calyx very small; wings oblong, 1″ long, with 1–3 bristles on each margin, each bearing an ovoid or oblong callosity; achene less than 1″ long, pointed, reddish, smooth, shining, its faces convex, its angles slightly margined.

On sandy shores, New Brunswick to Virginia, extending across the continent through British America, south in the interior to Kansas and New Mexico and on the Pacific Coast to California. Has been confounded with *R. maritimus* L. of the Old World. July–Oct.

4. OXÝRIA Hill, Veg. Syst. 10: 24. 1765.

Low fleshy glabrous perennial herbs, with slender erect stems. Leaves mostly basal, long-petioled, reniform or orbicular, cordate, palmately nerved, with cylindric ocreae. Flowers perfect, small, green, in terminal panicled racemes. Calyx unequally 4-parted, the outer segments smaller than the inner; stamens 6, included; filaments short, subulate, glabrous; anthers oblong. Ovary 1-celled; ovule solitary; style short, 2-parted, its branches divergent; stigmas fimbriate, persistent on the large wings of the fruiting calyx. Achene ovate, lenticular. Embryo straight, borne in the centre of the endosperm. [Greek, sour, from the acid leaves.]

Two known species, the following, and one in the Himalayas.

1. Oxyria dígyna (L.) Camptdera. Mountain Sorrel. (Fig. 1315.)

Rumex digynus L. Sp. Pl. 337. 1753.
O. digyna Camptdera, Rumex, 155. *pl. 3. f. 3.* 1819.
Oxyria reniformis Hook. Fl. Scot. 111. 1821.

Rootstock large, chaffy; stems scape-like, simple or sparingly branched, leafless or nearly so, 2′–12′ tall. Leaves reniform or orbicular-reniform, ½′–1½′ wide, undulate, sometimes emarginate at the apex, the basal long-petioled; ocreae oblique, loose, those on the stem bearing flowers; racemes many-flowered; flowers slender-pedicelled; segments oblong, the inner erect, the outer reflexed in fruit; achene pointed, smooth, surrounded by a broad membranous wing.

Greenland and Labrador to Alaska, south to the White Mountains of New Hampshire and in the Rocky Mountains to Colorado. Also in northern Europe and Asia. July–Sept.

5. FAGOPŸRUM Gaertn. Fr. & Sem. 2: 182. 1791.

Annual or perennial rather fleshy usually glabrous leafy herbs, with erect, simple or branched, striate or grooved stems. Leaves alternate, petioled, hastate or deltoid, with oblique, cylindric or funnelform ocreae. Flowers small, white or green, in terminal or axillary usually paniculate racemes, perfect, borne solitary or several together from each ocreola, slender-pedicelled. Calyx about equally 5-parted, persistent and unchanged in fruit, the segments petaloid, shorter than the achene. Stamens 8, included; filaments filiform, glabrous; anthers oblong. Ovary 1-celled, 1-ovuled; style 3-parted; stigmas capitate. Achene 3-angled. Embryo central, curved, dividing the mealy endosperm into two parts; cotyledons broad. [Greek, beech-wheat, from the similarity of the grain.]

About 6 species, natives of Europe and Asia.

Racemes panicled or corymbose; angles of the achene not crested. 1. *F. Fagopyrum.*
Racemes mostly simple; angles of the achene crested, undulate. 2. *F. Tataricum.*

1. Fagopyrum Fagopŷrum (L.) Karst. Buckwheat. (Fig. 1316.)

Polygonum Fagopyrum L. Sp. Pl. 364. 1753.
Fagopyrum esculentum Moench, Meth. 290. 1794.
F. Fagopyrum Karst. Deutsch. Fl. 522. 1880–83.

Annual, glabrous except at the nodes, stem strongly grooved when old, 1°–3° high. Leaves hastate, 1′–3′ long, abruptly narrowed above the middle, acuminate, the nerves on the lower surface slightly scurfy; ocreae brittle and fugacious; racemes mostly panicled, sometimes corymbose, many-flowered, erect or inclined to droop; pedicels as long as the calyx; segments white or whitish; stamens included; style-branches deflexed in fruit; achene acute, 2½″ long, about twice as long as the calyx, its faces pinnately-striate when mature, the angles acute, entire.

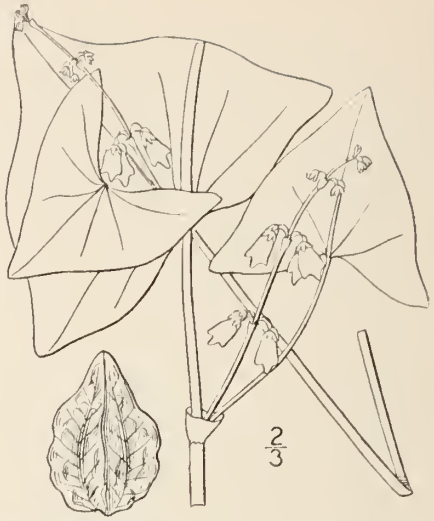
In waste places, and persistent in fields after cultivation. Reported from almost all parts of the northern United States and southern British America. Native of eastern Europe or western Asia. June–Sept.

2. Fagopyrum Tatáricum (L.) Gaertn. Tartary Buckwheat. (Fig. 1317.)

Polygonum Tataricum L. Sp. Pl. 364. 1753.
Fagopyrum Tataricum Gaertn. Fr. & Sem. 2: 182. *pl. 189. f. 6.* 1791.

Annual, similar to the preceding species, but the leaves deltoid-hastate or oblong-hastate, often broader than long, 1′–4′ wide, acute or short-acuminate at the apex; racemes terminal and axillary, mostly solitary, simple and few-flowered, long-peduncled; flowers whitish, short-pedicelled; achene subacute, 2½″ long, its angles crested with 3 prominent lobes above the middle, its faces pinnately sulcate from a conspicuous groove.

In waste places, eastern Canada and New England. Adventive from Asia. Summer.



6. POLÝGONUM L. Sp. Pl. 359. 1753.

Annual or perennial, terrestrial or aquatic herbs, some species woody, with erect, prostrate, climbing or floating stems, alternate sessile or petioled entire leaves, continuous with, or jointed, to the cylindric funnelform or two-lobed, often lacerate or fringed ocreae. Flowers small, normally perfect, green, white, pink or purple, variously clustered, the clusters terminal or axillary. Pedicels jointed, subtended by ocreae or ocreolae; calyx 4–5-parted or 4–5-cleft, the outer sepals or segments somewhat larger than the inner; stamens 5–9, included or exserted; filaments filiform, or dilated at the base, glabrous; anthers oblong; style 2–3-parted or 2–3-cleft, its branches included or exserted; stigmas capitate; achene lenticular or 3-angled (rarely 4-angled), invested by or exceeding the calyx. Embryo near the end of the seed, in one of its angles. [Greek, many-knees, from the swollen joints of some species.]

About 200 species, of wide geographic distribution. Besides the following, some 33 others occur in the western and southern parts of North America.

1. Flowers in terminal spicate racemes; calyx 5-cleft or 5-parted; stem not twining.
- Raceme solitary; alpine species; perennial, not aquatic. 1. *P. viviparum.*
- Racemes solitary or 2; aquatic or swamp species; perennials.
  - Leaves oblong, elliptic, or elliptic-lanceolate, not acuminate. 2. *P. amphibium.*
  - Leaves narrowly lanceolate, or oblong-lanceolate, not acuminate. 3. *P. Hartwrightii.*
  - Leaves ovate-lanceolate, or oblong-lanceolate, usually acuminate. 4. *P. emersum.*
- Racemes several or numerous; annuals or perennials, mostly terrestrial.
  - Ocreae naked or ciliolate, their limbs not spreading.
    - Racemes drooping.
      - Achene ovoid; style 2-parted to near the base. 6. *P. incarnatum.*
      - Achene broadly oblong-ovoid; style 2-cleft to below the middle. 7. *P. lapathifolium.*
    - Racemes erect.
      - Style-branches scarcely or slightly exserted.
        - Achene broadly oblong, biconvex. 5. *P. Portoricense.*
        - Achene orbicular, flat. 8. *P. Pennsylvanicum.*
      - Style branches long-exserted; achene ovoid, somewhat gibbous. 9. *P. longistylum.*
  - Ocreae fringed with bristles, their limbs not spreading.
    - Racemes not interrupted, erect; achene lenticular or 3-angled.
      - Ocreae conspicuously fringed; achene broadly ovoid. 10. *P. Persicaria.*
      - Ocreae inconspicuously fringed; achene narrowly ovoid. 11. *P. persicarioides.*
    - Racemes not interrupted, erect; achene always 3-angled.
      - Ocreolae conspicuously fringed. 14. *P. Opelousanum.*
      - Ocreolae inconspicuously fringed.
        - Leaves mostly glabrous above; achene pointed at the top. 15. *P. hydropiperoides.*
        - Leaves strigose above; achene pointed at both ends. 13. *P. setaceum.*
    - Racemes not interrupted, drooping. 12. *P. Careyi.*
    - Racemes interrupted, erect or drooping.
      - Achene granular and dull; racemes drooping. 16. *P. Hydropiper.*
      - Achene smooth, shining; racemes erect. 17. *P. punctatum.*
  - Ocreae fringed with bristles, their limbs normally spreading. 18. *P. orientale.*

2. Flowers in long naked much interrupted spicate racemes; calyx 4-parted. 19. *P. Virginianum.*

3. Flowers in axillary clusters; stems more or less wiry, not twining.
- Plants prostrate; achene invested by the calyx.
  - Achene pointed at the apex, rounded at the base.
    - Leaves mostly acute; style 3-parted to below the middle. 20. *P. aviculare.*
    - Leaves mostly obtuse; style 3-parted to the base. 21. *P. littorale.*
  - Achene pointed at both ends. 22. *P. Bellardi.*
- Plants prostrate; achene protruding beyond the calyx.
  - Leaves mostly longer than the internodes; sea beach species. 23. *P. maritimum.*
  - Leaves shorter than the internodes; plant of waste places. 24. *P. Rayi.*

Plants erect or ascending, rather stout.
Achene invested by the calyx.
Leaves oval, oblong or obovate, persistent. 25. *P. erectum.*
Leaves narrowly lanceolate or linear-oblong, persistent. 27. *P. ramosissimum.*
Leaves oblong-lanceolate or narrowly oblong, fugacious. 28. *P. camporum.*
Achene much exserted beyond the calyx. 26. *P. exsertum.*
Plants strictly erect and very slender.
Leaves with a lateral impression on either side of the midvein; fruiting pedicels stout, erect. 29. *P. tenue.*
Leaves without lateral impressions; fruiting pedicels slender, deflexed. 30. *P. Douglasii.*

4. Flowers in axillary and terminal clusters, racemes or panicled racemes; stems mostly twining.
Stems twining; herbaceous vines.
Outer segments of the calyx unchanged, or keeled in fruit.
Achene granular and dull; ocreae not bristly. 31. *P. Convolvulus.*
Achene smooth and shining; ocreae bristly. 32. *P. cilinode.*
Outer segments of the calyx conspicuously winged in fruit.
Calyx-wings not incised.
Fruiting calyx 5″–6″ long, the wings crisped. 33. *P. scandens.*
Fruiting calyx 3″–4″ long, the wings rather flat. 34. *P. dumetorum.*
Calyx-wings incised. 35. *P. cristatum.*
Stems stout, erect, tall; outer calyx-segments winged in fruit. 36. *P. Zuccarinii.*

5. Flowers in capitate clusters or racemes; stem climbing by recurved prickles.
Leaves sagittate; achene 3-angled. 37. *P. sagittatum.*
Leaves halberd-shaped; achene lenticular. 38. *P. arifolium.*

1. Polygonum viviparum L. Alpine Bistort. (Fig. 1318.)

Polygonum viviparum L. Sp. Pl. 360. 1753.

Perennial by a corm-like rootstock, mostly glabrous and somewhat glaucous; stems solitary or clustered, erect, simple, slender, 2′–10′ tall. Basal leaves oblong or lanceolate, 1′–8′ long, rather acute at the apex, cordate or subcordate at the base, long-petioled; stem leaves narrowly lanceolate or linear, 1′–3′ long, the lower petioled, the upper sessile, their margins often revolute; ocreae long, clasping below, open above; raceme solitary, terminal, narrow, rather dense, bearing a number of dark colored bulblets abont its base; calyx 5-parted, pale rose-color or white; stamens 8, exserted; style 3-parted, its branches exserted; achene oblong, 3-angled.

Greenland and Labrador to Alaska, south to the high summits of the mountains of New England, and in the Rocky Mountains to Colorado. Also in arctic and alpine Europe and Asia. June–Aug.

2. Polygonum amphibium L. Water Persicaria. (Fig. 1319.)

Polygonum amphibium L. Sp. Pl. 361. 1753.

Aquatic, perennial, glabrous when mature; stem floating or submersed, simple or sparingly branched, 4°–20° long. Leaves oblong, elliptic or elliptic-lanceolate, 1½′–4′ long, petioled, obtuse or subacute at the apex, slightly inequilateral, rounded or narrowed at the base, sometimes ciliate; ocreae cylindric, those of the branches often longer than the internodes, their limbs sometimes spreading, usually glabrous; raceme terminal, usually solitary, ½′–1′ long, dense, erect, oblong or ovoid; calyx rose-color, 5-parted; stamens 5, exserted; style 2-cleft, exserted; achene orbicular oblong, lenticular, 1½″ long, biconvex, black, smooth and shining, or granular.

In ponds and lakes, Quebec to Alaska, south to northern New Jersey, Kentucky, Colorado and California. Ascends to 2000 ft. in the Adirondacks. Also in Europe. July–Aug.

3. Polygonum Hartwrìghtii A. Gray. Hart Wright's Persicaria. (Fig. 1320.)

Polygonum Hartwrightii A. Gray, Proc. Am. Acad. 8: 294. 1870.

Perennial by rootstocks, more or less hispid throughout; stem ascending, decumbent or erect, 6′–2° long, many-jointed, grooved, usually rather stout. Leaves lanceolate, oblong-lanceolate or oblong, 3′–6′ long, obtuse or subacute at the apex, short-petioled or sessile; ocreae cylindric, varying from one-half as long to as long as the internodes, the limb abruptly spreading, fringed with short bristles; racemes usually solitary, dense, ½′–1′ long, oblong; calyx rose-colored, 5 parted; stamens 5, exserted; style exserted, 2-cleft to beyond the middle; achene oblong, biconvex, lenticular, black, smooth, shining.

In swamps or moist soil, Hudson Bay to Oregon, south to southern Pennsylvania, Kansas, Nevada and Lower California. June–Aug.

4. Polygonum emérsum (Michx.) Britton. Swamp Persicaria. (Fig. 1321.)

Polygonum amphibium var. *emersum* Michx. Fl. Bor. Am. 1: 240. 1803.
P. Muhlenbergii S. Wats. Proc. Am. Ac. 14: 295. 1879.
Polygonum emersum Britton, Trans. N. Y. Acad. Sci. 8: 73. 1889.

Perennial by long creeping or horizontal rootstocks, glabrous or strigose-pubescent; stem erect or assurgent, commonly simple, channeled, enlarged at the nodes, 1°–3° high. Leaves ovate-lanceolate or oblong-lanceolate, or the upper sometimes narrowly lanceolate, 2½′–8′ long, acute or usually acuminate at the apex, rounded or cordate at the base, petioled, the lateral nerves prominent, sometimes forking; ocreae cylindric, becoming loose, not ciliate; racemes 1 or 2, erect, 1′–3′ long, linear-oblong, dense, calyx dark rose-color, 5-parted; stamens 5, exserted; style 2-cleft, exserted; achene broadly obovate or orbicular, 1½″ long, very convex, lenticular, black and slightly granular, but shining.

In swamps and moist soil, Ontario to Northwest Territory and British Columbia, south to Virginia, Louisiana and Mexico. Ascends to 3000 ft. in Virginia. July–Sept.

5. Polygonum Portoricénse Bertero. Dense-flowered Persicaria. (Fig. 1322.)

Polygonum densiflorum Meisn. in Mart. Fl. Bras. 5: Part 1, 13. 1855. Not Blume, 1825–26.
Polygonum Portoricense Bertero; Meisn. in DC. Prodr. 14: 121. 1856.

Perennial, more or less scurfy; stem erect, decumbent or floating, 3°–5° long or longer, branched, enlarged at the nodes, often dark brown. Leaves lanceolate or linear-lanceolate, 1½′–12′ long, acuminate at both ends, obscurely punctate, short-petioled, the nerves prominent beneath; ocreae cylindric, sometimes bristly when young, naked when mature, sometimes hispid; racemes spicate, paniculate, often in pairs, 1′–5′ long, dense, erect; calyx white or whitish, 5-parted to near the base; stamens 6–8, included; style 2–3-cleft, somewhat exserted; achene lenticular and strongly biconvex or 3-angled, 1″–1½″ long, broadly oblong, orbicular or even broader than high, black, smooth and shining, or minutely granular.

In wet soil, Missouri to Florida, Texas, the West Indies and South America. May–Nov.

6. Polygonum incarnàtum Ell. Slender Pink Persicaria. (Fig. 1323.)

Polygonum incarnatum Ell. Bot. S. C. & Ga. 1: 456. 1817.

Annual, glabrous or nearly so, stem erect, simple or branched above, more or less swollen at the nodes, 2°–4° tall. Leaves lanceolate, 3′–9′ long, ½′–1½′ wide, acuminate at both ends, short-petioled, sparingly punctate and ciliate; ocreae cylindric, long, loose, brittle, sometimes ciliolate when young, glabrous when mature; racemes panicled, drooping, 1½′–4′ long, linear, many-flowered; calyx white or pink, small, 5-parted; stamens 6; style 2-parted to near the base; achene ovoid-oblong, lenticular, about 1″ long, flat or biconcave, smooth, shining.

In wet soil, Vermont to Illinois, south to Florida and Louisiana. June–Sept.

7. Polygonum lapathifòlium L. Dock-leaved or Pale Persicaria. (Fig. 1324.)

Polygonum lapathifolium L. Sp. Pl. 360. 1753.

Annual, stem simple or much branched, erect or ascending, swollen at the nodes, 1°–3° high, the peduncles and pedicels glandular. Leaves lanceolate or oblong-lanceolate, 2′–10′ long, usually broader than those of the preceding, attenuate to the apex, acuminate at the base, short-petioled, ciliate, inconspicuously punctate; ocreae cylindric, ribbed or striate; racemes panicled, 1′–4′ long, drooping, narrow, rather dense; calyx pink, greenish or white, 5-parted; stamens 6; style 2-parted to below the middle; achene broadly oblong or ovoid, lenticular, 1″ long, brownish or black, slightly reticulated but shining, its faces concave.

In waste places, throughout temperate North America. Naturalized from Europe. Sometimes a troublesome weed. Native also of Asia. June–Sept.

Polygonum lapathifolium nodòsum (Pers.) Small, Mem. Torr. Club, 5: 140. 1894.

Polygonum nodosum Pers. Syn. 1: 440. 1805.

Generally robust and glabrous; stem stout, reddish, purple spotted and with a purple ring below each ocrea, much thickened at the nodes; leaves conspicuously punctate; racemes 1′–3′ long, less drooping, often erect; achene slightly larger. Occasional in the range of the type.

Polygonum lapathifolium incànum (Schmidt) Koch, Syn. Fl. Germ. 711. 1837.

Polygonum incanum Schmidt, Fl. Boem. 4: 90. 1795.

Low, stem slender, erect, 2′–12′ high, slightly scurfy; leaves lanceolate, ovate or oblong, usually narrowed at the base, white-tomentose beneath, glabrous above; racemes ½′–1½′ long. In waste places, Nova Scotia to Ontario, New York and British Columbia.

8. Polygonum Pennsylvánicum L. Pennsylvania Persicaria. (Fig. 1325.)

Polygonum Pennsylvanicum L. Sp. Pl. 362. 1753.

Annual, glabrous below; stem erect, simple or branched, 1°–3° tall, the upper parts, the peduncles and pedicels glandular. Leaves lanceolate, acuminate at the apex, petioled, ciliate, 2′–11′ long, the upper sometimes glandular beneath; ocreae cylindric, thin, naked, glabrous; racemes panicled, erect, thick, oblong or cylindric, dense, 1′–2′ long; calyx dark pink or rose-color, 5-parted; stamens 8 or fewer; style 2-cleft to about the middle; achene orbicular or mostly broader than high, 1½″ long, short-pointed, lenticular, smooth, shining.

In moist soil, Nova Scotia to Ontario, Minnesota, Florida and Texas. Ascends to 2000 ft. in Virginia. July–Sept.

9. Polygonum longístylum Small. Long-styled Persicaria. (Fig. 1326.)

Polygonum longistylum Small, Bull. Torr. Club, 21: 169. 1894.

Annual or perennial, glabrous except the glandular upper branches and peduncles; stem erect, rather slender, 1°–3° tall, becoming somewhat woody below. Leaves lanceolate or ovate-lanceolate, 1′–6′ long, acuminate at both ends, petioled, their margins undulate, slightly crisped, more or less ciliolate; ocreae cylindric, entire, brittle, soon falling away; racemes panicled, sometimes geminate, 1′–4′ long, rather dense, erect; calyx lilac, 5-parted to below the middle, the lobes petaloid; stamens 6–8, included; style 2-parted, slender, conspicuously exserted; stigmas black; achene broadly ovoid, lenticular, slightly gibbous on both sides, long-pointed, black, granular, but somewhat shining, 1¼″ long.

In moist soil, Southern Illinois and Missouri to Louisiana and New Mexico. Aug.–Oct.

10. Polygonum Persicària L. Lady's Thumb. (Fig. 1327.)

Polygonum Persicaria L. Sp. Pl. 361. 1753.

Annual, glabrous or puberulent; stem erect or ascending, simple or much branched, ½°–2° high. Leaves lanceolate or linear-lanceolate, 1′–6′ long, short-petioled or nearly sessile, acuminate at both ends, conspicuously punctate, usually with a dark triangular or lunar blotch near the centre, their margins entire or slightly eroded, often ciliate; ocreae cylindric, nearly glabrous, fringed with short bristles; racemes solitary or panicled, ½′–2′ long, ovoid or oblong, dense, erect; calyx pink or dark purple; stamens mostly 6; style 2–3-parted to below the middle; achene broadly ovate and lenticular, often gibbous or 3-angled, 1″–1¼″ long, smooth and shining.

In waste places, throughout North America, except the extreme north. Naturalized from Europe. Often an abundant weed. June–Oct.

11. Polygonum persicarioides H.B.K. Southwestern Persicaria. (Fig. 1328.)

P. persicarioides H.B.K. Nov. Gen. 2: 179. 1817.

Perennial, glabrous or minutely pubescent; stem erect, decumbent or creeping, simple or branched, 1°–3° long. Leaves lanceolate or linear-lanceolate, acuminate at both ends, punctate, short-petioled or subsessile, 1½′–10′ long; ocreae cylindric, glabrous or sparingly strigillose, fringed with short bristles; spicate racemes more or less panicled, erect, 1′–3′ long, narrowly oblong or linear, loosely-flowered; calyx rose-color tinged with green, 5-parted to below the middle; stamens 8 or fewer, included; style 2–3-parted to near the base; achene lenticular and biconvex, or 3-angled, more or less gibbous, 1″ long, ovoid or broadly oblong, short-pointed, black, minutely granular, but shining.

Nebraska to Mexico; widely distributed in tropical America. June–Sept.

12. Polygonum Càreyi Olney. Carey's Persicaria. (Fig. 1329.)

Polygonum Careyi Olney, Proc. Providence Franklin Soc. 1: 29. 1847.

Annual, rough-glandular throughout, stem erect, 1°–3° tall, simple or sparingly branched above. Leaves oblong-lanceolate or linear-lanceolate, the uppermost nearly linear, 2′–11′ long, short-petioled or nearly sessile, acuminate at both ends, hispid on the midrib, ciliate, sparingly punctate; ocreae cylindric, sparsely hispid, fringed with long bristles; racemes several, narrow, terminal, loosely-flowered, drooping, 1′–2½′ long; calyx purplish; stamens 5 or sometimes 8; style 2-parted to below the middle; achene lenticular, broadly ovoid or obovoid, 1¼″–1½″ long, short-pointed, thick, smooth and shining.

In marshes, Ontario to Rhode Island, New Jersey and Pennsylvania. Ascends to 2000 ft. in Pennsylvania. Also in Michigan. July–Sept.

13. Polygonum setàceum Baldw. Bristly Persicaria. (Fig. 1330.)

Polygonum setaceum Baldw.; Ell. Bot. S. C. & Ga. 1: 455. 1817.

Perennial, glabrous or strigose-pubescent above, stem 2°–4° high, erect, simple or sparingly branched; leaves lanceolate or oblong-lanceolate, 2′–9′ long, mostly short-petioled, acuminate at both ends, ciliate, inconspicuously punctate; ocreae cylindric, long, strigose, fringed with very long bristles; racemes few, terminal, 1′–2½′ long, erect, linear-oblong, sometimes geminate, rather loosely flowered; calyx white or pink; stamens 8; style 3-parted to below the middle; achene 3-angled, oblong or obovoid, short, thick-pointed, ½″–2″ long, minutely reticulated and rather dull, or smooth and shining.

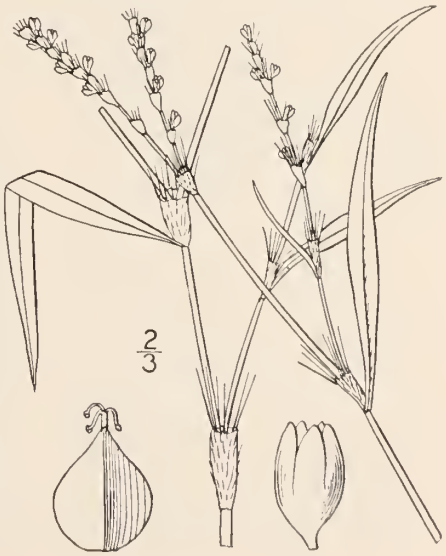
In swamps, southern Missouri to Louisiana, east to North Carolina and Florida. June–Sept.

14. Polygonum Opelousànum Riddell. Opelousas Persicaria. (Fig. 1331.)

Polygonum Opelousanum Riddell; Small, Bull. Torr. Club, 19: 354. 1892.

Perennial, glabrous or nearly so throughout, stem slender, erect or ascending, sparingly or considerably branched, 1°–3° tall, becoming woody below. Leaves linear or linear-lanceolate, 1½′–5′ long, sessile, ciliate; ocreae cylindric, strigose, fringed with long bristles; spicate racemes panicled, erect, often geminate, ½′–2′ long, not densely flowered; calyx white, pedicelled, 5-parted to below the middle; stamens 8 or fewer, included; style deeply 3-parted; achene 3-angled or rarely 4-angled, broadly ovoid or obovoid, ¾″ long, black, smooth and shining.

Missouri to Louisiana, Texas and Mexico. July–Sept.



15. Polygonum hydropiperoides Michx. Mild Water Pepper. (Fig. 1332.)

P. hydropiperoides Michx. Fl. Bor. Am. 1: 239. 1803.
Polygonum mite Pers. Syn. 1: 440. 1805.

Perennial, glabrous or strigillose, stem erect, decumbent or prostrate, simple or branched above, slender, 1°–3° long. Leaves narrowly lanceolate or oblong-lanceolate, varying to linear-lanceolate, 2′–6′ long, short-petioled, acute at apex, ciliate, pubescent with appressed hairs on the midrib beneath; ocreae cylindric, loose, strigose, fringed with long bristles; racemes paniculed, terminal, erect, narrow, more or less interrupted, 1½′–3′ long; calyx pink or greenish; stamens 8; style 3-parted to below the middle; achene 3-angled, ovoid or oblong, 1″–1¼″ long, smooth, shining.

In swamps and wet soil, New Brunswick to Minnesota and California, south to Florida and Mexico. June–Sept.

Polygonum hydropiperoides Macoùni Small, Mem. Dept. Bot. Col. Coll. 1: 81. 1895.

More robust than the type, stem 1°–3° long, clothed with stout appressed hairs; leaves lanceolate, obtuse; ocreolae more or less ciliate; calyx white or whitish, often conspicuous. Quebec to West Virginia and Indiana. Also in California.

16. Polygonum Hydrópiper L. Smart-weed. Water Pepper. (Fig. 1333.)

Polygonum Hydropiper L. Sp. Pl. 361. 1753.

Annual, glabrous, stem erect, simple or branched, red or reddish, sometimes green, 8′–24′ tall. Leaves lanceolate or oblong-lanceolate, 1′–4′ long, short-petioled, acute or acuminate at the apex, undulate or slightly crisped, punctate, ciliate, very acrid, ocreae cylindric, fringed with short bristles, sometimes slightly pubescent, usually swollen at the base by the development of several flowers within; racemes paniculed, 1′–3′ long, narrow, drooping, interrupted; calyx green, 3–5-parted (usually 4-parted) conspicuously punctate; stamens 4 or sometimes 6; style short, 2–3-parted; achene lenticular or 3-angled, broadly oblong or ovoid, slightly gibbous, 1¼″–1½″ long, granular, dull.

In moist waste places, almost throughout North America. Naturalized from Europe in our area, perhaps indigenous in the far Northwest. July–Sept.

17. Polygonum punctàtum Ell. Dotted or Water Smart-weed. (Fig. 1334.)

P. punctatum Ell. Bot. S. C. & Ga. 1: 455. 1817.
P. acre H.B.K. Nov. Gen. 2: 179. 1817. Not Lam.

Annual or perennial, glabrous or very nearly so, stem erect or ascending, rarely prostrate, simple or branched, 1°–3° long. Leaves lanceolate or oblong-lanceolate, 1′–8′ long, acuminate at both ends, petioled, ciliate, conspicuously punctate, acrid, the midrib often with a few scattered hairs; ocreae cylindric; falling away at maturity; fringed with long bristles; racemes terminal, narrow, erect or slightly drooping; loosely flowered, ½′–3′ long; calyx greenish; stamens 8; style 2–3-parted to the base; acheue oblong, short, thick, lenticular or 3-angled 1¼″ long, smooth, shiuing.

In swamps and wet places, throughout North America except the extreme north. June–Oct.

Polygonum punctàtum leptostàchyum (Meisn.) Small, Bull. Torr. Club, 19: 356. 1892.
Polygonum acre var. *leptostachyum* Meisn. in DC. Prodr. 14: 108. 1856.
Rather smaller; stem slender, 1°–2° long; leaves narrower; racemes very slender and much in-

terrupted, clustered at the summit; achene about 1″ long, oblong, shining. Vermont to California, south to Florida and Mexico.

Polygonum punctàtum robústior Small, Bull. Torr. Club, 21: 477. 1894.

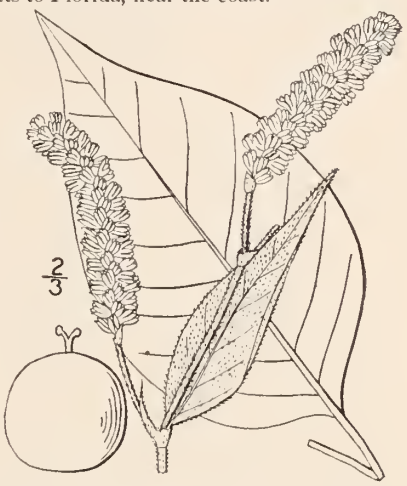
Larger and stouter than the type, leafy; stem 2°–5° tall, conspicuously enlarged at the nodes; leaves 2′–8′ long; racemes thicker, 1′–4′ long, interrupted below; achene 1½″ long, slightly granular, somewhat obovoid; calyx-segments white. Massachusetts to Florida, near the coast.

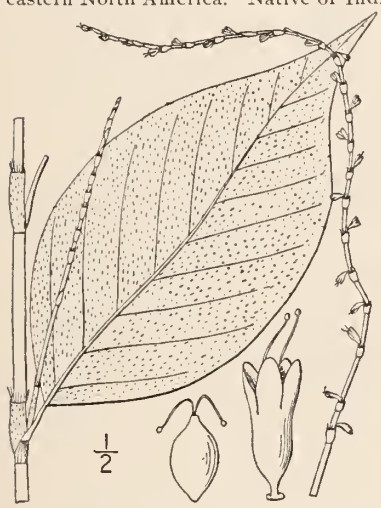
18. Polygonum orientàle L. Prince's Feather. (Fig. 1335.)

Polygonum orientale L. Sp. Pl. 362. 1753.

Annual, more or less hispid, stem erect, 1°–8° tall, branched. Leaves ovate or broadly oblong, 3′–12′ long, petioled, acuminate at the apex, ciliate; petioles slightly winged; ocreae cylindric, loose, with or without a spreading border, ciliate; racemes panicled, oblong-cylindric, 1′–4′ long, dense, drooping; flowers large for the genus, calyx dark rose-color or crimson; stamens 7, exserted; style 2-cleft to above the middle, included; stigmas large; achene orbicular or broader than long, lenticular, flat, nearly 1½″ in diameter, finely reticulated and rather dull.

In waste places, escaped from gardens throughout eastern North America. Native of India. Aug.–Sept.





19. Polygonum Virginiànum L. Virginia Knotweed. (Fig. 1336.)

Polygonum Virginianum L. Sp. Pl. 360. 1753.

Annual, nearly glabrous or strigose-pubescent, stem erect or arching, simple or branched above, 1°–4° tall. Leaves ovate or elliptic-ovate or ovate-lanceolate, short-petioled, acuminate at the apex, 2′–6′ long, sparingly ciliate; ocreae cylindric, strigose, fringed with short bristles; racemes spicate, erect, terminal and axillary, naked, greatly elongated and interrupted, sometimes 12′ long; calyx curved, greenish or rose-color, 4-cleft; stamens 5; style long, exserted, 2-parted to the base, its branches at length curled; achene 2″ long, ovate-oblong, lenticular, strongly biconvex, dark brown or cream-colored, smooth, shining.

In woods, Nova Scotia to Minnesota, south to Florida and Texas. Ascends to 4000 ft. in North Carolina. July–Nov.

20. Polygonum aviculàre L. Knotgrass. Door-weed. (Fig. 1337.)

Polygonum aviculare L. Sp. Pl. 362. 1753.

Annual or commonly perennial, slender, glabrous, dull green or bluish green, stem prostrate or ascending, simple or branched, 4′–2° long. Leaves oblong, linear or oblanceolate, 3″–10″ long, nearly sessile or short-petioled, jointed to the ocreae, narrowed at the base, usually acute at the apex, not conspicuously veined; ocreae oblique, silvery, 2-parted or at length lacerate; clusters axillary, 1–5-flowered; flowers small, short-pedicelled; calyx green, 5-parted, the lobes with white or pink borders; stamens 5–8; style short, 3-parted to near the base; achene 3-angled, ovoid, 1″ long, acute, reticulated.

A weed in cultivated and waste grounds, common almost throughout North America, Asia and Europe. June–Oct.

21. **Polygonum littorale** Link. Shore Knotweed. (Fig. 1338.)

Polygonum littorale Link in Schrad. Journ. 1: 54. 1799.

Annual or perennial, stout, glabrous, bright green or slightly glaucous, stem 1°–4° long, prostrate or ascending, diffusely branched from a woody base, striate. Leaves oblong, oblong-lanceolate or oblanceolate, 2″–9″ long, obtuse or subacute at the apex, mostly acuminate at the base, prominently veined, often crisped, jointed to the ocreae; ocreae oblique, 2-parted, at length lacerate; flowers axillary, 2–6 in each cluster; calyx green, its lobes whitish-margined or carmine; stamens 8; style short, 3-parted to the base; achene broadly ovoid, 3-angled, 1½″ long, more or less narrowed at the base and apex.

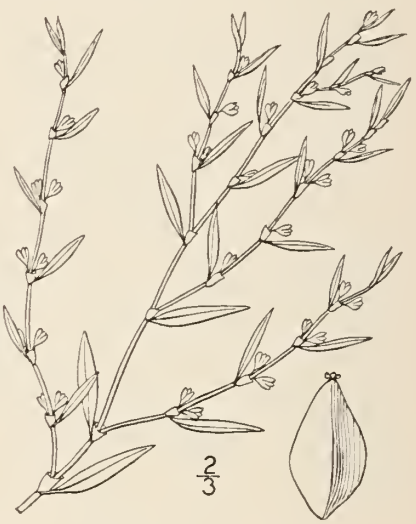
On shores and in waste places, New Brunswick to Minnesota and California, south to Virginia, Illinois and Kansas. Also in Europe. Aug.–Sept.

22. **Polygonum Bellardi** All. Bellard's Knotweed. (Fig. 1339.)

Polygonum Bellardi All. Fl. Ped. 2: 205. *pl. 90. f. 2.* 1785.

Annual, dingy green, stem slender, prostrate or spreading, 1°–3° long, simple or diffusely branched, striate. Leaves oblong-lanceolate or linear-lanceolate, short-petioled, 2″–20″ long, acute at the apex, acuminate at the base, distant, prominently veined beneath, jointed to the ocreae; ocreae oblique, silvery, slightly lacerate when young, becoming much incised when old; flowers 1–3 together in the axils; calyx green, its lobes white-margined; stamens 8; style 3-parted to the base, very short; achene ovoid or oblong-ovoid, 3-angled, rather pointed at both ends, 1″–1¼″ long, reticulated and rather dull.

In waste grounds, Washington, D. C. Adventive from eastern Europe or western Asia.



23. **Polygonum maritimum** L. Seaside Knotweed. (Fig. 1340.)

Polygonum maritimum L. Sp. Pl. 361. 1753.
Polygonum glaucum Nutt. Gen. 1: 254. 1818.

Perennial or sometimes annual, glaucous, glabrous, root usually deep, woody, stem prostrate or ascending, branched, 8′–20′ long, deeply striate. Leaves ovate or oblong, mostly equalling or longer than the internodes, 3″–12″ long, fleshy, veined beneath, somewhat rugose above, conspicuously jointed to the ocreae, the margins often revolute; ocreae large, silvery, 2-parted or at length lacerate, becoming brown at the base; flowers 1–3 together in the axils, becoming slender-pedicelled; calyx white or pinkish; stamens 8; style short, 3-parted; achene 3-angled, ovoid or narrowly ovoid, 1½″ long, acute or acuminate, smooth, shining, longer than the calyx.

In sands of the seashore, Maine to Florida. Also on the coast of Europe. July–Sept.

24. Polygonum Ràyi Babingt. Ray's Knotweed. (Fig. 1341.)

Polygonum Rayi Babingt. Man. Brit. Bot. Ed. 2, 275. 1848.

Perennial or annual, glabrous, slightly glaucous, stem 3′–24′ long, prostrate, usually much branched, striate. Leaves ovate-lanceolate or oblong, 3″–15″ long, short-petioled, acute or obtusish at the apex, veined beneath, inconspicuously so above, shorter than the internodes, inconspicuously jointed to the ocreae; ocreae 2-parted, becoming lacerate, silvery, brown and glaucous at the base when old; flowers 2–4 together in the axils; stamens 5 or 6; style short, 3-parted to the base; achene ovoid, 3-angled, 2″–3″ long, slightly granular but shining, much exceeding the calyx.

In waste places, New Brunswick and Prince Edward Island to British Columbia, south along the Atlantic Coast to Virginia. Naturalized from Europe? May–Sept.

25. Polygonum eréctum L. Erect Knotweed. (Fig. 1342.)

Polygonum erectum L. Sp. Pl. 363. 1753.

Annual, glabrous, stem erect or ascending, 8′–2° high, terete, nearly simple or much branched. Leaves oval, oblong or obovate, subsessile or short-petioled, 3″–18″ long, obtuse or subacute at the apex, conspicuously jointed to the ocreae; ocreae oblique, funnelform, soon lacerate, silvery when young; flowers 1–2 together in the axils; calyx greenish, enlarged in fruit; stamens 6 (sometimes 5) style very short, 3-parted to near the base; achene ovoid-pyramidal, 3-angled, 1½″ long, reticulated and dull, invested by the calyx, or the apex slightly protruding.

In moist or dry soil, Ontario to the Northwest Territory, Tennessee and Arkansas. July–Sept.

26. Polygonum exsértum Small. Long-fruited Knotweed. (Fig. 1343.)

P. exsertum Small, Bull. Torr. Club, 21: 172. 1894.

Annual, glabrous, sometimes slightly glaucous, stem slender, brownish, erect or nearly so, conspicuously striate, branched, 1½°–3° tall. Leaves lanceolate, rarely oblanceolate, ½′–1½′ long, acute or cuspidate at the apex, acuminate at the base, nearly sessile; ocreae 2–4-parted when young, soon lacerate, silvery, becoming brownish; calyx greenish, or white, 6-parted to near the base; stamens 5 or 6, included; style 3-cleft or 3-parted, very short; achene 3-angled, narrowly pyramidal, 2½″–3″ long, more or less constricted above the middle, chestnut-brown, smooth, shining, 2–3 times as long as the calyx, at length twisted.

Northwest Territory, south to Illinois, Missouri and Nebraska and on the Atlantic coast, in brackish marshes, from Maine to New York. Aug.–Oct.

27. Polygonum ramosíssimum Michx. Bushy Knotweed. (Fig. 1344.)

P. ramosissimum Michx. Fl. Bor. Am. 1: 237. 1803.

Annual, bright green or yellowish green, glabrous, stem erect or ascending, usually very much branched, slender, striate, usually rigid, 4′–4° tall. Leaves lanceolate or linear-oblong, short-petioled, 3″–20″ long, acuminate at both ends, persistent, conspicuously jointed to the ocreae; ocreae oblique, funnelform, few-nerved, becoming deeply lacerate; flowers several together in the axillary clusters, short-pedicelled; calyx 5–6-parted, greenish-white; stamens 6 or fewer; style very short, 3-parted to the base; achene 3-angled, acute, sometimes slightly protruding beyond the calyx, nearly 1½″ long, black, reticulated, dull.

In saline soil, Minnesota to the Northwest Territory, New Mexico and California, and on the Atlantic coast from Maine to New Jersey. July–Sept.

Polygonum ramosissimum prolificum Small, Bull. Torr. Club, 21: 171. 1894.

Bushy, much branched, stem nearly erect, its internodes short, its nodes giving off 2 or more branches; leaves narrower; flowers and achenes more numerous. Nebraska and Kansas; also on the coast of Maine.

28. Polygonum campòrum Meisn. Prairie Knotweed. (Fig. 1345.)

P. camporum Meisn. in Mart. Fl. Bras. 5: 21. 1855.

Annual or perennial, glabrous, stem mostly erect, slightly striate, much branched, sometimes slightly glaucous, 2°–3° tall. Leaves linear-lanceolate or oblong, soon falling away, subsessile, rather obtuse at the apex, veined beneath, 3″–12″ long; ocreae funnelform, early lacerate and fugacious, dark brown; flowers several together in the axillary clusters, slender-pedicelled; pedicels short; stamens 8; style short, 3-parted; achene pyramidal-ovoid, 3-angled, black, nearly 1½″ long, smooth, shining.

On prairies, Nebraska to Louisiana and New Mexico. Also in South America. July–Sept.

29. Polygonum ténue Michx. Slender Knotweed. (Fig. 1346.)

Polygonum tenue Michx. Fl. Bor. Am. 1: 238. 1803.

Annual, glabrous, somewhat rough about the nodes, stem very slender or filiform, erect, simple or branched, somewhat 4-angled, 4′–12′ tall. Leaves linear or linear-lanceolate, sessile, acuminate at the apex, 2″–12″ long, articulated to the ocreae, 1-ribbed with a lateral impression on each side of the rib, the margins minutely scabrous or serrulate; ocreae funnelform, soon lacerate; flowers several in the axillary clusters, green, subsessile; calyx-lobes whitish; stamens 8; style 3-parted nearly to the base, its branches diverging; fruit erect; achene 3-angled, black, 1″–1½″ long, reticulated on the angles, the centre of its faces smooth.

Dry soil, Ontario to Minnesota, Georgia and Arkansas. Ascends to 3000 ft. in North Carolina. July–Sept.

30. Polygonum Douglásii Greene. Douglas' Knotweed. (Fig. 1347.)

Polygonum Douglasii Greene, Bull. Cal. Acad. (II.) 1: 125. 1885.

Annual, similar to the preceding species, glabrous, somewhat rough at the nodes, sometimes slightly glaucous, stem erect, 8′–18′ tall, simple or usually much branched, almost terete. Leaves oblong or narrowly lanceolate, ½′–2′ long, subsessile, rather thin, flat or revolute, with no lateral impressions parallel to the midrib; ocreae oblique, short, soon laccrate; clusters axillary, several-flowered; the flowers and fruit deflexed; calyx green with white or rose-colored margin; stamens 8; style 3-parted; achene 3-angled, 1¼″–2″ long, oblong or ovoid-oblong, black, smooth and shining.

Northwest Territory and British Columbia to New Mexico and Indian Territory, east through Ontario to northern New York and Vermont. June–Sept.

31. Polygonum Convólvulus L. Black Bindweed. (Fig. 1348.)

Polygonum Convolvulus L. Sp. Pl. 364. 1753.

Annual, glabrous, scurfy, stem twining or trailing, 6′–3° long, mostly branched, the internodes elongated. Leaves ovate-sagittate or the uppermost lanceolate-sagittate, long-petioled, acuminate at the apex, slightly ciliate, ½′–3′ long; ocreae oblique, short, rough on the margin; axillary clusters or racemes loosely flowered; flowers greenish, pendulous on slender pedicels; calyx 5-parted, closely investing the achene, the outer lobes slightly or not at all keeled; stamens 8; style short, nearly entire; stigmas 3; achene 3-angled, obovoid-pyramidal, 1½″ long, thick-pointed, black, granular, rather dull.

In waste and cultivated grounds, nearly throughout North America except the extreme north. Naturalized from Europe. Native of Asia. Sometimes a troublesome weed. Calyx rarely 6-parted. July–Sept.

32. Polygonum cilinòde Michx. Fringed Black Bindweed. (Fig. 1349.)

P. cilinode Michx. Fl. Bor. Am. 1: 241. 1803.

Perennial, sparingly pubescent, stem red or reddish, twining or prostrate, 1°–10° long. Leaves broadly ovate or somewhat hastate, acuminate at the apex, cordate at the base, rather long-petioled, undulate, finely ciliate, 1′–4′ long, or the upper smaller; ocreae small, armed with reflexed bristles near the base; racemes mostly panicled, axillary and terminal, interrupted; calyx whitish; style short, 3-parted to the base; achene 3-angled, oblong-pyramidal or ovoid, nearly 1½″ long, very smooth and shining.

In rocky places, Nova Scotia to Ontario, Minnesota and Pennsylvania, south in the Alleghanies to North Carolina. Ascends to 2000 ft. in the Catskills. June–Sept.

33. Polygonum scándens L. Climbing False Buckwheat. (Fig. 1351.)

Polygonum scandens L. Sp. Pl. 364. 1753.

Perennial, glabrous, stem climbing, 2°–20° long, rather stout, striate, branched, rough on the ridges. Leaves ovate, acuminate, cordate at the base, 1′–6′ long or the upper smaller, the larger long-petioled, finely punctate, the margins scabrous; ocreae oblique, smooth and glabrous; racemes usually numerous and panicled, interrupted, leafy, 2′–8′ long; flowers yellowish-green, long-pedicelled; calyx 5-parted, the three outer segments very strongly winged and decurrent on the pedicels, especially in fruit; stamens 8; style almost none; stigmas 3; fruiting calyx 5″–6″ long, the wings crisped, not incised; achene 2″–2½″ long, 3-angled, rather blunt at both ends, smooth, shining.

In woods and thickets, Nova Scotia to Ontario and the Rocky Mountains, south to Florida, Nebraska and Texas. Aug.–Sept.

34. Polygonum dumetòrum L. Copse or Hedge Buckwheat. (Fig. 1350.)

Polygonum dumetorum L. Sp. Pl. Ed. 2, 522. 1762.

Perennial, glabrous, similar to the preceding species, stem extensively twining, 2°–12° long, striate, much branched. Leaves ovate or somewhat hastate, and sometimes inequilateral, acuminate at the apex, cordate at the base, 1′–2½′ long, long petioled, or the upper smaller and nearly sessile; ocreae oblique, smooth; racemes mostly axillary, numerous, much interrupted, leafy-bracted, 2′–5′ long; flowers yellowish green, pendulous; calyx 5-parted, the three outer segments winged or keeled and much enlarged in fruit; stamens 8; style short, 3-parted; fruiting calyx 3″–4″ long, the wings nearly flat, not incised; achene oblong, 3-angled, 2″ long, inclined to be pointed at both ends, black, smooth, shining.

Prairies of Illinois and about St. Louis, Mo. Also in the vicinity of Knoxville, Tenn. Naturalized from Europe? July–Sept.

35. Polygonum cristàtum Engelm. & Gray. Crested False Buckwheat. (Fig. 1352.)

Polygonum cristatum Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 259. 1847.

Perennial, scurfy, stem slender, twining, 2°–10° long, more or less branched. Leaves triangular or ovate, 1′–5′ long, acuminate at the apex, undulate, truncate or cordate at the base, rather long-petioled; ocreae cylindric-funnelform; flowers in axillary simple or compound often naked racemes 1′–5′ long; pedicels about 2½″ long, jointed near the middle; calyx greenish-white, 2″–2½″ long, 5-parted to near the base, the 3 outer segments keeled and at maturity winged; stamens 8, included; style none; stigmas 3; fruiting calyx 3″–4″ long, its wings incised; achene 3-angled, oblong, black, smooth, shining, about 1½″ long.

Sandy woods and rocky banks, southern New York to Georgia, the Indian Territory and Texas. Aug.–Oct.

36. Polygonum Zuccarínii Small. Japanese Knotweed. (Fig. 1353.)

Polygonum cuspidatum Sieb. & Zucc. Fl. Jap. Fam. Nat. 2: 84. 1846. Not Willd. 1825.
Polygonum Zuccarinii Small, Mem. Dept. Bot. Col. Coll. 1: 158. *pl. 66.* 1895.

Perennial, glabrous, more or less scurfy, stem stout, erect, woody below, terete or slightly angled, much branched, 4°–8° tall. Leaves oblong-ovate or ovate-lanceolate, petioled, 2′–6′ long, acuminate-cuspidate at the apex, truncate or subcordate at the base, reticulate-veined on both surfaces, their margins undulate; ocreae oblique, smooth, fugacious; racemes mostly terminal, panicled, 2′–4′ long, or axillary, many-flowered, more or less pubescent; flowers greenish-white, long-pedicelled; outer segments of the 5-parted calyx very broadly winged in fruit; stamens 8; style 3 parted; achene 3-angled, narrowly oblong or oblong-pyramidal, 1¼″–1½″ long, black, smooth, shiniug.

Escaped from cultivation near Philadelphia, Pa., Schenectady, N. Y., and Atlantic Highlands, N. J. Native of Japan. July–Oct.

37. Polygonum sagittàtum L. Arrow-leaved Tear-thumb. (Fig. 1354.)

Polygonum sagittatum L. Sp. Pl. 363. 1753.

Anuual, light green, stem slender, weak, decumbent, or climbing over other plants by the abundant sharp recurved prickles which arm its 4 prominent angles. Leaves lanceolate-sagittate or oblong-sagittate, ½′–3′ long, obtuse or acute at the apex, slightly rough on the margins, the lower petioled, the upper subsessile; petioles and lower surface of the midribs prickly; ocreae oblique, not ciliate, fringed at the base by a few bristle-like prickles; flowers in rather dense terminal heads or racemes; calyx greenish or rose-colored; stamens usually 8; style 3-parted to below the middle; achene 3-angled, oblong-pyramidal, thick-pointed, 1½″ long, dark red, smooth, shining.

In wet soil, Newfoundland and Nova Scotia to the Northwest Territory, south to Florida and Kansas. Ascends to 3000 ft. in Virginia. July–Sept.

38. Polygonum arifòlium L. Halberd-leaved Tear-thumb. (Fig. 1355.)

Polygonum arifolium L. Sp. Pl. 364. 1753.

Perennial, stem ridged, reclining, 2°–6° long, the ridges armed with recurved prickles. Peduncles and pedicels glandular or pubescent; leaves broadly hastate, long-petioled, 1′–10′ long, pubescent or glabrous beneath, the apex and basal lobes acuminate; petioles and stronger nerves prickly; ocreae oblique, fringed at the summit with short bristles and at the base with slender prickles; flowers in terminal and axillary heads or racemes; calyx rose-color or greenish, 4-parted; stamens 6; style 2-parted. achene lenticular, broadly obovate, 2″ long, strongly biconvex, dark browu, smooth, shining.

In moist or wet soil, New Brunswick and Ontario to Minnesota, south to South Carolina. July–Sept.

7. POLYGONÉLLA Michx. Fl. Bor. Am. 2: 240. 1803.

Annual or perennial glabrous herbs, sometimes slightly woody, with erect branched usually conspicuously jointed stems, alternate narrow leaves articulated to the naked ocreae, and small white or greenish flowers in slender panicled racemes. Calyx unequally 5-parted, persistent, its segments petalloid, loosely investing the achene or its base in fruit, the three inner calyx-segments often winged. Stamens 8, included; filaments filiform, or much dilated or auricled at the base; anthers oblong, small. Style 3-parted, short or almost wanting; stigmas capitate; ovary 1-celled, ovule solitary. Achene 3-angled, smooth. Embryo slender, nearly straight, situated in one of the angles of the seed. [Diminutive of Polygonum.]

Five or six species, natives of North America.

Annual; inner sepals not winged in fruit; pedicels reflexed. 1. *P. articulata.*
Perennial; inner sepals winged in fruit; pedicels divergent. 2. *P. Americana.*

1. Polygonella articulàta (L.) Meisn. Coast Jointweed. (Fig. 1356.)

Polygonum articulatum L. Sp. Pl. 363. 1753.
Polygonella articulata Meisn. Gen. 2: 228. 1836–'43.

Annual, glaucous, stem slender, wiry, erect or sometimes diffusely spreading, simple or branched, striate or slightly angled, 4′–10′ long. Leaves linear or linear-subulate (apparently filiform from the revolute margins), sessile, 4″–20″ long, jointed to the summits of the ocreae, cylindric, slightly expanded at the summit; racemes numerous, erect, many-flowered, 1′–1½′ long; ocreolae crowded or imbricated; pedicels reflexed; calyx-segments white with a dark midrib, loosely investing the achene, not winged in fruit; achene narrowly ovoid-pyramidal, pointed, 1″ long, brown, smooth, shining.

In sands of the seashore and sandy soil along the coast, Maine to Florida, and on the shores of the Great Lakes. July–Oct.

2. Polygonella Americàna (F. & M.) Small. Southern Jointweed. (Fig. 1357.)

Gonopyrum Americanum F. & M. Mem. Acad. St. Petersb. (VI.) 4: 144. 1840.
Polygonella ericoides Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 230. 1845.
P. Americana Small, Mem. Torr. Club, 5: 141. 1894.

Perennial by a long slender root, slightly glaucous, stem erect or ascending, wiry, somewhat flexuous, 1½°–4° high, simple or slightly branched, covered with a ridged more or less scaly bark. Leaves linear or linear-spatulate, ¼′–1′ long, often fascicled on short branches, sessile, rather fleshy, obtuse and revolute at the apex; ocreae scarious-margined, split on one side; racemes 1′–3′ long, dense, divergent; calyx white or pink, its three inner segments developing orbicular cordate wings, the two outer reflexed in fruit; pedicels divergent, jointed below the middle; achene elliptic-oblong, 1¼″ long, chestnut-brown, pointed at both ends, smooth, shining.

In dry soil, Missouri to Texas, east to Georgia and Alabama. Aug.–Oct.

8. BRUNNÍCHIA Banks; Gaertn. Fr. & Sem. 1: 213. *pl. 45. f. 2.* 1788.

Perennial, glabrous herbs with elongated, grooved much branched stems climbing by tendrils at the ends of the branches, and alternate entire broad cordate petioled leaves, the ocreae obscure or wanting, and small perfect flowers in panicled terminal and axillary racemes, the flowers fascicled in the axils of lanceolate-subulate bracts. Pedicels slender, jointed near the base. Calyx 5-parted, much enlarged, coriaceous and winged on one side in fruit, closely investing the achene, the segments spreading when fresh, converging when dry. Stamens 7–10, mostly 8; filaments filiform, much dilated at the base; anthers ovate-

oblong. Style 3-parted, the stigmas 2-cleft at the summit; ovary imperfectly 2-celled; ovule solitary, pendulous. Achene 3-angled. Seed irregularly 6-grooved, the embryo in one of its angles. [Name in honor of M. T. Brunnich, Norwegian naturalist.]

Two known species, the following of southeastern North America, the other of tropical Africa.

1. Brunnichia cirrhòsa Banks. Brunnichia. (Fig. 1358.)

Brunnichia cirrhosa Banks; Gaertn. Fr. & Sem. 1: 213. *pl. 45. f. 2.* 1788.
Rajania ovata Walt. Fl. Car. 247. 1788.

Stem 6°–20° long, somewhat woody, rather tough, slender, grooved. Tendrils numerous, filiform; leaves ovate or ovate-lanceolate, acute or acuminate at the apex, truncate or subcordate at the base, 1′–6′ long, petioled, slightly pubescent beneath; ocreae obsolete or represented by a ring of short bristles; racemes 2′–6′ long; flowers in fascicles of from 2–5; calyx campanulate, 3″–4″ long, greenish, 5-parted, its base strongly winged along one side; stamens exserted; achene oblong-ovoid, 3″ long, brown, smooth, closely invested by the persistent and coriaceous calyx which becomes 1′ or more in length.

On banks of streams, southern Illinois to Arkansas, east to South Carolina and Florida. May–June. Fruit mature in August.

Family 15. CHENOPODIÀCEAE Dumort. Anal. Fam. 15. 1829.

GOOSEFOOT FAMILY.

Annual or perennial herbs, rarely shrubs, with angled striate or terete stems. Leaves alternate or sometimes opposite, exstipulate, simple, entire, toothed or lobed, mostly petioled (in *Salicornia* reduced to mere ridges). Flowers perfect, pistillate, polygamous, monoecious or dioecious, small, green or greenish, regular or slightly irregular, variously clustered, commonly in panicled spikes, bractless or bracteolate, occasionally solitary in the axils. Petals none. Calyx persistent, 2–5-lobed, 2–5-parted or rarely reduced to a single sepal, wanting in the pistillate flowers of some genera. Stamens as many as the lobes or divisions of the calyx, or fewer, and opposite them; filaments slender; anthers 2-celled, longitudinally dehiscent. Disk usually none. Ovary mostly superior and free from the calyx, 1-celled; ovule solitary, amphitropous; styles 1–3; stigmas capitate, or 2–3-lobed or divided. Fruit a utricle, with a thin or coriaceous pericarp. Seed vertical or horizontal; endosperm mealy, fleshy or wanting; embryo partly or completely annular or conduplicate, or spirally coiled.

About 75 genera and 550 species, of wide geographical distribution.

* **Embryo annular or conduplicate, not spirally coiled; endosperm copious (except in *Salicornia*).**

Leafy herbs; endosperm copious.
- Fruit enclosed by or not longer than the calyx or bractlets.
  - Flowers perfect or some of them pistillate; calyx herbaceous or fleshy.
    - Calyx 2–5-lobed or 2–5-parted; stamens 1–5.
      - Fruiting calyx wingless, its segments often keeled.
        - Calyx herbaceous or but slightly fleshy in fruit; flowers in panicled spikes. 1. *Chenopodium.*
        - Fruiting calyx dry, strongly reticulated; leaves pinnatifid. 2. *Roubieva.*
        - Calyx very fleshy and bright red in fruit; flowers densely capitate. 3. *Blitum.*
      - Fruiting calyx horizontally winged. 4. *Cycloloma.*
    - Calyx of 1 sepal; stamen 1. 5. *Monolepis.*
  - Flowers monoecious or dioecious; calyx of pistillate flowers none; fruit enclosed by 2 bractlets.
    - Bractlets flat or convex, not silky. 6. *Atriplex.*
    - Bractlets silky-pubescent, conduplicate. 7. *Eurotia.*
  - Flowers perfect; calyx membranous; leaves filiform-linear. 8. *Kochia.*
- Fruit much exserted beyond the calyx. 9. *Corispermum.*

Leafless fleshy herbs with opposite branches; endosperm none. 10. *Salicornia.*

** **Embryo spirally coiled; endosperm little or none.**

Shrub; flowers monoecious, not bracteolate. 11. *Sarcobatus.*

Herbs; flowers perfect, bracteolate.
- Fruiting calyx wingless; leaves fleshy, not spiny. 12. *Dondia.*
- Fruiting calyx bordered by a thin horizontal wing; leaves very spiny. 13. *Salsola.*

1. CHENOPÒDIUM L. Sp. Pl. 218. 1753.

Annual or perennial, green and glabrous, white-mealy or glandular-pubescent herbs, with alternate petioled entire sinuate-dentate or pinnately lobed leaves. Flowers very small, green, perfect, sessile, bractless, clustered in axillary or terminal, often panicled or compound spikes. Calyx 2–5-parted or 2–5-lobed, embracing or enclosing the utricle, its segments or lobes herbaceous or slightly fleshy, often keeled or ridged. Stamens 1–5; filaments filiform or slender. Styles 2 or 3; seed horizontal or vertical, sometimes in both positions in different flowers of the same species, firmly attached to or readily separable from the pericarp; endosperm mealy, farinaceous; embryo completely or incompletely annular. [Greek, goose-foot, from the shape of the leaves.]

About 60 species, mostly weeds, of wide geographic distribution. Besides the following, some 5 others occur in the western parts of North America.

* Embryo a complete ring.

Leaves white-mealy on the lower surface.
- Leaves or some of them sinuate-toothed or lobed.
  - Sepals strongly keeled in fruit.
    - Pericarp firmly attached to the seed; stem erect, tall. 1. *C. album.*
    - Pericarp readily detached from the seed; stem low. 6. *C. Fremontii incanum.*
  - Sepals not keeled in fruit; stem decumbent. 2. *C. glaucum.*
- Leaves mostly entire, narrowly linear or oblong. 3. *C. leptophyllum.*

Leaves green and glabrous or nearly so on both surfaces when mature.
- Leaves oblong or ovate-oblong, entire. 4. *C. polyspermum.*
- Leaves, at least the lower, sinuate, toothed or incised.
  - Stamens 5; calyx not fleshy.
    - Pericarp readily separable from the seed.
      - Leaves oblong or lanceolate; calyx-lobes scarcely keeled. 5. *C. Boscianum.*
      - Leaves triangular-hastate; calyx-lobes keeled. 6. *C. Fremontii.*
    - Pericarp firmly attached to the seed.
      - Flower-clusters, at least the upper, longer than the leaves.
        - Leaves oblong, rhombic-ovate or lanceolate, narrowed at the base.
          - Leaves obtuse or merely acute. 1. *C. album viride.*
          - Leaves or some of them cuspidate or bristle-tipped. 7. *C. Berlandieri.*
        - Leaves triangular-ovate, truncate or subcordate at base. 8. *C. urbicum.*
      - Spikes loosely panicled in the axils, the panicles shorter than the leaves. 9. *C. murale.*
  - Stamens only 1 or 2; calyx slightly fleshy, red. 11. *C. rubrum.*
- Leaves very coarsely 2–6-toothed. 10. *C. hybridum.*
- Leaves broadly triangular-hastate, entire or merely undulate. 12. *C. Bonus-Henricus.*

** Embryo an incomplete ring.

Leaves ovate or oblong, pinnately lobed; flowers in long loose panicles. 13. *C. Botrys.*

Leaves lanceolate; flowers in continuous or interrupted spikes.
- Spikes borne in the axils of the numerous small upper leaves. 14. *C. ambrosioides.*
- Spikes in large commonly leafless terminal panicles. 15. *C. anthelminticum.*

1. Chenopodium álbum L. Lamb's Quarters. White Goosefoot. Pigweed. (Fig. 1359.)

Chenopodium album L. Sp. Pl. 219. 1753.

Annual, pale green, stem usually slender, striate and grooved at least when dry, erect, commonly much branched, 1°–10° tall, the branches ascending. Leaves rhombic-ovate or the upper lanceolate or linear-lanceolate, narrowed at the base, acute or sometimes obtuse at the apex, 3-nerved, white-mealy beneath, dentate, sinuate or lobed, or the upper entire, 1′–4′ long; petiole often as long as the blade; spikes terminal and axillary, simple or compound, often panicled; calyx about ½″ broad in fruit, its segments strongly keeled, usually completely enclosing the utricle; seed horizontal, black, shining, firmly attached to the pericarp; embryo a complete ring.

In waste places. A common weed throughout North America except the extreme north. Naturalized from Europe. Native also of Asia. Widely distributed as a weed in all cultivated regions. Stem often purple-streaked. June–Sept.

Chenopodium álbum viride (L.) Moq. in DC. Prodr. 13: Part 2, 71. 1849.

Chenopodium viride L. Sp. Pl. 219. 1753.

Plant brighter green; leaves green on both sides or but slightly mealy beneath. Range of the type. Perhaps a distinct species.

2. Chenopodium glaùcum L. Oak-leaved Goosefoot. (Fig. 1360.)

Chenopodium glaucum L. Sp. Pl. 220. 1753.
Blitum glaucum Koch, Syn. Fl. Germ. 608. 1837.

Annual, succulent, stem usually much branched, decumbent or prostrate, or with erect branches, 4′–18′ high. Leaves oblong, lanceolate or ovate-lanceolate, slender-petioled or the uppermost nearly sessile, obtuse or acute at the apex, mostly narrowed at the base, white-mealy beneath, dark green above, 1′–2′ long, the lower or all of them sinuate-dentate or lobed; flowers in small axillary often branched spikes, the clusters usually shorter than the leaves, or the upper panicled; calyx about ½″ broad, its segments oblong or obovate, obtuse, neither fleshy nor keeled in fruit; utricle brown, depressed, its summit not completely covered by the calyx; seed of lateral flowers vertical, thick, somewhat exserted, that of terminal flowers commonly horizontal; embryo a complete ring.

A weed in waste places throughout North America except the extreme north. Naturalized from Europe; now found in most cultivated areas of the globe. June–Sept.

3. Chenopodium leptophýllum (Moq.) Nutt. Narrow-leaved Goosefoot. (Fig. 1361.)

Chenopodium album var. *leptophyllum* Moq. in DC. Prodr. 13: Part 2, 71. 1849.
Chenopodium leptophyllum Nutt.; Moq. in DC. Prodr. 13: Part 2, 71. As synonym. 1849.
Chenopodium leptophyllum var. *oblongifolium* S. Wats. Proc. Am. Acad. 9: 95. 1874.

Annual, scarcely succulent, stem slender, usually erect, striate or grooved, at least when dry, branched, 6′–2½° tall, mealy above, the branches erect-ascending. Leaves linear to oblong, white-mealy beneath, green above, acute or acuminate, or the lower obtuse, entire or the lower rarely toothed, short-petioled, ½′–1½′ long, 1″–3″ wide, 1–3-nerved; flowers in continuous or interrupted axillary and terminal simple or branched spikes; calyx about ½″ broad, its segments strongly keeled and nearly covering the fruit; seed horizontal, readily detached from the pericarp; embryo a complete ring.

In dry soil, Manitoba and the Northwest Territory to Missouri, New Mexico and Arizona. Also on the shores of Lake Erie and on sands of the seashore, Connecticut to New Jersey. July–Sept.

Chenopodium leptophýllum subglàbrum S. Wats. Proc. Am. Acad. 9: 95. 1874.

Leaves scarcely mealy or quite green; flowers loosely clustered. Western Nebraska and Colorado.

4. Chenopodium polyspérmum L. Many-seeded Goosefoot. (Fig. 1362.)

Chenopodium polyspermum L. Sp. Pl. 220. 1753.

Annual, glabrous, not mealy, stem stout or slender, erect or decumbent, commonly much branched, striate, 6′–3° high. Leaves oblong, elliptic or ovate, slender-petioled, entire, thin, green on both sides, obtuse at the apex, narrowed rounded or truncate at the base, 1′–3′ long, 4″–1½′ wide; flowers in loose axillary and terminal panicles; calyx less than 1″ wide, its segments oblong, subacute or obtuse, somewhat scarious, not keeled, not completely covering the top of the fruit; seed firmly attached to the pericarp, horizontal; embryo a complete ring.

In waste places and ballast, Massachusetts to New Jersey. Adventive from Europe. July–Sept.

5. Chenopodium Boscìànum Moq. Bosc's Goosefoot. (Fig. 1363.)

Chenopodium Boscianum Moq. Enum. Chenop. 21. 1840.

Annual, light green, stem slender, erect, striate, usually much branched, 1°–3° tall, the branches very slender, divergent or ascending. Leaves thin, green on both sides, lanceolate or oblong-lanceolate, acute or acuminate at the apex, narrowed at the base, slender-petioled, 1′–2½′ long, the lower sinuate-dentate or nearly all of them entire; flowers in slender terminal and axillary spikes; calyx-segments broadly oblong, obtuse, scarious-margined, not at all keeled, or scarcely so in fruit, herbaceous, nearly covering the utricle; seed horizontal, readily separating from the pericarp, black, shining; embryo completely annular.

In woods and thickets, New York and New Jersey to Indiana and Minnesota, south to North Carolina and Texas. July–Sept.

6. Chenopodium Fremóntii S. Wats. Fremont's Goosefoot. (Fig. 1364.)

Chenopodium Fremontii S. Wats. Bot. King's Exp. 287. 1871.

Annual, glabrous or very nearly so, light green, stem stout or slender, erect, grooved, branched, 1°–3° tall. Leaves thin, green on both sides, broadly triangular-hastate, sinuate-dentate or the upper entire, mostly obtuse at the apex, truncate or abruptly narrowed at the base, slender-petioled, 1′–4′ long and nearly as wide, the uppermost sometimes very small, oblong or lanceolate and acute; spikes slender, axillary to the upper leaves and in terminal panicles; calyx ½″ wide, its segments keeled in fruit, and nearly enclosing the utricle; pericarp easily separable from the seed; seed horizontal, shining; embryo completely annular.

In woods and thickets, Nebraska to Colorado and Nevada, south to New Mexico. July–Sept.

Chenopodium Fremóntii incànum S. Wats. Proc. Am. Acad. 9: 94. 1874.

Low, stems stout and much branched, the branches and lower surfaces of the leaves densely white-mealy; leaves ¼′–1′ long. Range of the type. Possibly a distinct species.

7. Chenopodium Berlandièri Moq. Berlandier's Goosefoot. (Fig. 1365.)

Chenopodium Berlandieri Moq. Enum. Chenop. 23. 1840.

Annual, slightly mealy when young, green when old, stem erect, commonly much branched, 1½°–3° tall, the branches slender, ascending. Leaves lanceolate, oblong or rhombic-lanceolate, slender-petioled, thin, some or all of them cuspidate-acuminate at the apex or bristle-tipped, narrowed at the base, sinuate-dentate or entire, ½′–1½′ long; flowers in rather loose terminal panicled spikes; calyx nearly 1″ broad, its segments keeled, completely enclosing the utricle; pericarp firmly attached to the horizontal seed; embryo a complete ring.

In dry soil, southern Missouri to Texas, and in Florida. June–Sept.

8. Chenopodium úrbicum L. Upright or City Goosefoot. (Fig. 1366.)

Chenopodium urbicum L. Sp. Pl. 218. 1753.

Annual, green or but slightly mealy, stem commonly stout, erect, branched or simple, channeled, 1°–3° tall. Leaves hastate or triaugular-ovate, acute at the apex, truncate subcordate or abruptly narrowed at the base, stout-petioled, coarsely and irregularly dentate or the uppermost entire, the larger 3′–5′ long; spikes in terminal and axillary narrow erect panicles, the upper longer than the leaves; calyx ½″ broad, its segments oblong, obtuse, herbaceous, not keeled and not entirely enclosing the fruit; seed horizontal, rather firmly attached to the pericarp, its margins rounded; embryo a complete ring.

In waste places, especially in the cities, Nova Scotia and Ontario to southern New York. Adventive from Europe. Much less common than the following species. June–Sept.

9. Chenopodium muràle L. Nettle-leaved Goosefoot. Sowbane. (Fig. 1367.)

Chenopodium murale L. Sp. Pl. 219. 1753.

Annual, scarcely or not at all mealy, somewhat scurfy above, stem erect or decumbent, usually branched, 1°–2½° high, leafy to the summit. Leaves rhombic-ovate, thin, bright green on both sides, acute or acuminate at the apex, sharply and coarsely sinuate-dentate, broadly cuneate or subtruncate at the base, slender-petioled, 2′–4′ long; flowers in loose axillary panicles shorter than the leaves, often not longer than the petioles; calyx-segments not entirely enclosing the utricle; seed sharp-edged, horizontal, firmly attached to the pericarp; embryo completely annular; stamens 5.

In waste places, Maine to Michigan and British Columbia, south to Florida and Mexico. Naturalized from Europe. Widely distributed as a weed in civilized regions. June–Sept.

10. Chenopodium hýbridum L. Maple-leaved Goosefoot. (Fig. 1368.)

Chenopodium hybridum L. Sp. Pl. 219. 1753.

Annual, bright green, not mealy, sometimes more or less scurfy; stem slender, erect, usually branched, 2°–4½° tall. Leaves ovate or rhombic-ovate, long-acuminate at the apex, truncate rounded or subcordate at the base, thin, slender-petioled, sharply dentate with 1–4 large acute teeth on each side, or the upper lanceolate and entire, the lower 4′–7′ long; flowers in large axillary and terminal panicles; calyx about 1″ broad, its segments oblong, rather obtuse, herbaceous, slightly keeled, incompletely covering the fruit; stamens 5; seed horizontal, sharp-edged, firmly attached to the pericarp; embryo a complete ring.

In woods and thickets, sometimes in waste places, Quebec to the Northwest Territory and British Columbia, south to southeastern New York, Kentucky, Kansas, Utah and New Mexico. Also in Europe. July–Sept.

11. Chenopodium rùbrum L. Red Goosefoot. (Fig. 1369.)

Chenopodium rubrum L. Sp. Pl. 218. 1753.
Blitum rubrum Reichb. Fl. Germ. Exc. 582. 1830–32.

Annual, glabrous, somewhat fleshy, not mealy, stem erect, leafy, 1°–2½° tall, often much branched, the branches strict or ascending. Leaves thick, 1½′–4′ long, rhombic-ovate or rhombic-lanceolate, petioled, acute acuminate or obtuse at the apex, narrowed at the base, coarsely sinuate-dentate or the upper entire; flowers in erect compound leafy-bracted axillary and terminal spikes often exceeding the leaves; calyx 3–5-parted, its segments slightly fleshy, red, not keeled, obtuse, about as long as the utricle; stamens 1 or 2; stigmas short; seed horizontal, shining, rather sharp-edged, separating from the pericarp; embryo annular.

On the seacoast, Newfoundland to New Jersey, and in saline soil in the interior across the continent, south to central New York, Nebraska and British Columbia. Also in Europe and Asia. July–Sept.

12. Chenopodium Bònus-Henrìcus L. Good King Henry. Perennial Goosefoot. (Fig. 1370.)

Chenopodium Bonus-Henricus L. Sp. Pl. 218. 1753.
Blitum Bonus-Henricus Reichb. Fl. Germ. Exc. 582. 1830–32.

Perennial by a thick rootstock, glabrous, dark green, not mealy; stem erect, usually stout, simple or little branched, channeled, 1°–2½° tall. Leaves broadly triangular-hastate, palmately veined, entire or undulate (rarely with 1 or 2 small teeth), the apex and basal lobes usually acute, the lower long-petioled (petiole often twice as long as the blade), the upper much smaller and short-petioled; flowers in terminal and axillary, simple or panicled, commonly dense spikes sometimes 3′–4′ long; calyx 4–5-parted, the segments not longer than the fruit; stigmas elongated; seed vertical, or that of terminal flowers horizontal, black, shining, blunt-edged; embryo a complete ring.

In waste places, Nova Scotia and Ontario to Massachusetts and southern New York. Naturalized from Europe. June–Sept.

13. Chenopodium Bòtrys L. Feather Geranium. Jerusalem Oak. (Fig. 1371.)

Chenopodium Botrys L. Sp. Pl. 219. 1753.

Annual, green, glandular-pubescent and viscid, strong-scented; stem slender, erect, simple or branched, 8′–2° tall. Leaves ovate or oblong, deeply and usually irregularly pinnately lobed, acute or obtuse at the apex, petioled, ½′–2′ long, or the uppermost much smaller, the lobes mostly obtuse and dentate; flowers very small, in numerous loose axillary cymose panicles mostly longer than the leaves; calyx 3–5-parted, the segments lanceolate, acute, thin, very pubescent, rather longer then the utricle; seed horizontal or vertical, firmly attached to the pericarp; embryo an incomplete ring.

In waste places, Nova Scotia to Minnesota and Oregon, southeastern New York, Kentucky and Mexico. Naturalized from Europe. Native also of Asia. The leaves fall in autumn, leaving the panicles as narrow naked wands. Also called Turnpike Geranium. July–Sept.

14. Chenopodium ambrosioìdes L. Mexican Tea. (Fig. 1372.)

Chenopodium ambrosioides L. Sp. Pl. 219. 1753.

Annual, glabrous or slightly glandular-pubescent, green, not mealy, strong-scented, stem much branched, ascending or erect, leafy, 2°–3° high, angular and grooved. Leaves oblong or oblong-lanceolate, obtuse or subacute at the apex, narrowed to a short petiole, repand-dentate, undulate or the upper entire, 1′–3½′ long, the upper numerous and much smaller; flowers in small dense axillary spikes, mostly shorter than the subtending leaves; calyx usually 3-parted, completely enclosing the fruit; pericarp readily separable from the seed; seed horizontal or vertical, shining; embryo an incomplete ring.

In waste places, Maine and Ontario to Florida, west across the continent to California. Naturalized from tropical America. Introduced as a weed also into southern Europe and Asia. Aug.–Oct.

15. Chenopodium anthelmínticum L. Wormseed. (Fig. 1373.)

Chenopodium anthelminticum L. Sp. Pl. 220. 1753.

Chenopodium ambrosioides var. *anthelminticum* A. Gray, Man. Ed. 5, 408. 1867.

Annual or sometimes perennial, rather dark green, similar to the preceding species and perhaps intergrading with it, stem somewhat stouter, 2½°–3½° long. Leaves lanceolate or ovate-lanceolate, usually acuminate at the apex and narrowed at the base, slender-petioled, coarsely dentate or incised, 2′–5′ long, the lower 1′ or more wide, the upper gradually smaller, the uppermost commonly linear-lanceolate and entire; flowers in linear usually bractless panicled spikes, or the lower spikes leafy-bracted; seed horizontal or vertical; embryo an incomplete ring.

In waste places, southern New York and southern Ontario to Wisconsin, south to Florida and Mexico. Naturalized from Europe. Aug.–Oct.

2. ROUBIÈVA Moq. Ann. Sci. Nat. (II.) 1: 292. 1834.

A perennial herb, glandular-pubescent, strong-scented, prostrate, and diffusely branched, with narrow small short-petioled deeply pinnatifid leaves. Flowers small, green, perfect, or pistillate, solitary, or in small axillary clusters. Calyx urn-shaped, 3-5-toothed, narrowed at the throat, in fruit becoming obovoid, strongly reticulated and closed. Stamens 5. Styles 3, exserted. Wall of the pericarp thin, glandular. Seed vertical. Embryo a complete ring in the mealy endosperm. [Name in honor of G. J. Roubieu, French botanist.]

A monotypic genus of South America, often included in *Chenopodium*.

1. **Roubieva multifida** (L.) Moq. Cut-leaved Goosefoot. Roubieva. (Fig. 1374.)

Chenopodium multifidum L. Sp. Pl. 220. 1753.
Roubieva multifida Moq. Ann. Sci. Nat. (II.) 1: 293. *pl. 10.* 1834.

Usually much branched, very leafy, prostrate, or the branches ascending, 6′–18′ long. Leaves lanceolate or linear-lanceolate or linear-oblong in outline, ½′–1½′ long, 1½″–4″ wide, deeply pinnatifid into linear-oblong acute entire or toothed lobes; flowers 1–5 together in the axils, sessile, less than ½″ broad, some perfect, some pistillate; fruiting calyx obovoid, obtuse, 3-nerved and strongly reticulate-veined, ½″ thick; utricle compressed.

In waste places and ballast, southern New York to Virginia. Naturalized or adventive from tropical America. June–Sept.

3. BLÌTUM L. Sp. Pl. 2. 1753.

Annual glabrous or sparingly pubescent succulent branching herbs, with alternate hastate petioled rather light green leaves. Flowers small, green, or reddish, aggregated in globose axillary sessile heads, or the upper heads forming an interrupted spike. Calyx 2–5-lobed, becoming pulpy and bright red in fruit. Stamens 1–5. Pericarp separating from the seed. Seed vertical, shining. Embryo a complete ring in the mealy endosperm. [The classical name of orache.]

One or perhaps two species, natives of North America and Europe.

1. Blitum capitàtum L. Strawberry Blite. (Fig. 1375.)

Blitum capitatum L. Sp. Pl. 2. 1753.
Chenopodium capitatum Aschers. Fl. Brand. 572. 1864.

Stem ascending, erect, or prostrate, 6′–2° long, commonly much branched, the branches ascending. Leaves usually longer than wide, 1½′–3′ long, rather thin, sinuate-dentate, or the upper or sometimes all of them entire, cordate or reniform, the apex and basal lobes acute or acuminate; lower petioles often longer that the blades; heads sessile in the axils and on the sides of the upper part of the stem or branches, 2″–3″ in diameter in flower, becoming bright red and 5″–8″ in diameter in fruit, and then somewhat resembling strawberries; seed compressed, ovate, enclosed by the calyx, or when quite mature slightly exserted.

In dry soil, Nova Scotia to Alaska, south to New Jersey, Illinois, Minnesota, in the Rocky Mountains to Colorado and Utah and to Nevada. Also in Europe. June–Aug.

4. CYCLOLÒMA Moq. Enum. Chenop. 17. 1840.

An annual diffusely branched glabrous or cobwebby-pubescent herb, with alternate petioled irregularly toothed leaves, and small sessile bractless flowers in panicled interrupted spikes. Calyx 5-lobed, the lobes keeled in flower, a thin horizontal irregularly dentate wing developing below them in fruit. Stamens 5. Styles 2–3. Fruit (except its summit) enclosed by the calyx, depressed. Seed horizontal; embryo a complete ring in the mealy endosperm. [Greek, circle-border, alluding to the calyx-wing.]

A monotypic genus of north central North America.

1. Cycloloma atriplicifòlium (Spreng.) Coult. Cycloloma. (Fig. 1376.)

Kochia atriplicifolia Spreng. Nactr. Fl. Hal. 2: 35. 1801.
Cycloloma platyphyllum Moq. Enum. Chenop. 18. 1840.
C. atriplicifolium Coult. Mem. Torr. Club, 5: 143. 1894.

Pale green or becoming dark purple, bushy-branched, 6′–20′ high, the stem aud branches angular and striate. Leaves lanceolate, mostly acuminate at the apex, narrowed into slender petioles, irregularly sinuate-dentate with acute teeth, 1′–3′ long or the upper much smaller; spikes numerous in terminal panicles, loosely flowered, 1′–3′ loug, slender; fruit, including the winged calyx, 2″ broad; calyx-lobes not completely covering the summit of the utricle, which appears as a 5-rayed area.

Along streams and on banks, Manitoba to Indiana and Illinois, west to the Northwest Territory, Nebraska and Arizona. Summer.

5. MONÓLEPIS Schrad. Ind. Sem. Gott. 4. 1830.

Low annual brauching herbs, with small narrow alternate entire toothed or lobed leaves, and polygamous or perfect flowers in small axillary clusters. Calyx of a single persisteut herbaceous sepal. Stamen 1. Styles 2, slender. Utricle flat, the pericarp adherent to the smooth vertical seed. Embryo a very nearly complete ring in the mealy endosperm, its radicle turned downward. [Greek, single-scale, from the solitary scpal.]

Three known species, natives of western North America, the following one reaching our limits.

1. Monolepis Nuttalliàna (R. & S.) Greene. Monolepis. (Fig. 1377.)

Blitum chenopodioides Nutt. Gen. 1: 4. 1818. Not Lam. 1783.
Blitum Nuttallianum R. & S. Mant. 1: 65. 1822.
Monolepis chenopodioides Moq. in DC. Prodr. 13: Part 2, 85. 1849.
Monolepis Nuttalliana Greene, Fl. Fran. 168. 1891.

Slightly mealy when young, pale greeu, glabrous or uearly so when old; stem 3′–12′ high; branches many, ascending. Leaves lanceolate iu outline, short-petioled, or the upper sessile, ½′–2½′ long, narrowed at the base, 3-lobed, the middle lobe linear or liuear-oblong, acute or acuminate, 2–4 times as long as the asceuding lateral ones; flowers clustered in the axils; sepal oblanceolate or spatulate, acute or subacute; pericarp minutely pitted, about ½″ broad; margins of the seed acute.

In alkaline or dry soil, Manitoba and the Northwest Territory to Minnesota, Nebraska, New Mexico and southern California. June–Sept.

6. ÁTRIPLEX L. Sp. Pl. 1052. 1753.

Annual or perennial herbs or low shrubs, often scurfy-canescent or silvery. Leaves alternate, petioled or sessile, or some of them opposite. Flowers dioecious or monoecious, small, green, in panicled spikes or capitate-clustered in the axils. Staminate flowers bractless, consisting of a 3–5-parted calyx and an equal number of stamens; filaments separate or united by their bases; a rudimentary ovary sometimes present. Pistillate flowers subtended by 2 bractlets which enlarge in fruit and are more or less united, sometimes quite to their summits, their margins entire or toothed, their sides smooth, crested, tubercled or winged; periauth none; ovary globose or ovoid; stigmas 2. Utricle completely or partially enclosed by the fruiting bractlets. Seed vertical or rarely horizontal; embryo annular, the radicle pointing upward or downward; endosperm mealy. [From a Greek name of orache.]

About 130 species, of very wide geographic distribution. Besides the following, some 45 others occur in the western parts of North America.

Annual herbs; stems or branches erect, diffuse or ascending.
Leaves hastate, ovate, rhombic-lanceolate or linear-lanceolate.
Plants green, glabrous or sparingly scurfy, not silvery; leaves slender-petioled.
Leaves lanceolate, several times longer than wide. 1. *A. patula.*
Leaves triangular-hastate, the lower only 1–2 times as long as wide. 2. *A. hastata.*

Plant very scurfy; leaves rhombic-ovate, short-petioled. 3. *A. rosea.*
Plants densely silvery; leaves hastate, entire or little toothed.
Staminate spikes dense, short; leaves petioled. 4. *A. argentea.*
Staminate spikes elongated interrupted; upper leaves sessile. 5. *A. expansa.*
Leaves oblong, densely silvery, entire; plant of sea beaches. 6. *A. arenaria.*
Perennial herbs or shrubs; leaves oblong or oblanceolate, entire; plants of the western plains.
Fruiting bractlets suborbicular, wingless, their sides crested or tubercled. 7. *A. Nuttallii.*
Fruiting bractlets appendaged by 4 vertical reticulated wings. 8. *A. canescens.*

1. Atriplex pátula L. Spreading Orache. (Fig. 1378.)

Atriplex patula L. Sp. Pl. 1053. 1753.
Atriplex littoralis L. Sp. Pl. 1054. 1753.

Annual, dark green, glabrous or somewhat scurfy above; stem much branched, diffuse, ascending or sometimes erect, 1°–3° long. Leaves lanceolate or linear-lanceolate, slender-petioled, or the uppermost nearly sessile, entire, sparingly toothed, or 3-lobed below the middle, acuminate at the apex, narrowed or cuneate at the base, 1′–5′ long, 2″–1½′ wide; flowers in panicled interrupted slender mostly leafless spikes, and usually also capitate in the upper axils; fruiting bractlets united only at the base, fleshy, triangular or rhombic, 3″–4″ wide, their sides often tubercled; radicle of the embryo ascending.

In waste places and ballast, Nova Scotia and Ontario to southern New York and New Jersey. Naturalized from Europe, or perhaps indigenous northward. Native also of Asia. Much less common than the following species. July–Aug.

2. Atriplex hastàta L. Halberd-leaved Orache. (Fig. 1379.)

Atriplex hastata L. Sp. Pl. 1053. 1753.
A. patulum var. *hastatum* A. Gray, Man. Ed. 5, 409. 1867.
Atriplex patula var. *subspicata* S. Wats. Proc. Am. Acad. 9: 107. 1874.

Annual, pale green, or purple, somewhat scurfy, at least when young; stem erect or ascending, branched, 1°–2½° tall. Leaves slender-petioled, acuminate, the lower broadly triangular-hastate, seldom more than twice as long as wide, entire or sparingly toothed, 1′–4′ long, truncate or narrowed at the base, the basal lobes divergent, acute or acuminate; upper leaves sometimes triangular-lanceolate; inflorescence as in the preceding species; the fruiting bractlets sometimes broader.

In salt meadows and waste places mostly near the coast, New Brunswick to South Carolina, and in saline soil, Manitoba to British Columbia, Nebraska and Utah. Also in Europe. The western plant is more scurfy than the eastern. Aug.–Oct.

3. Atriplex ròsea L. Red Orache. (Fig. 1380.)

Atriplex rosea L. Sp. Pl. Ed. 2, 1493. 1763.

Annual, pale green and very scurfy, stem erect or decumbent, usually much branched, 1°–2½° high. Leaves ovate or rhombic-ovate, short-petioled or the upper sessile, coarsely sinuate-dentate, obtuse or acute at the apex, narrowed or subtruncate at the base, ½′–3½′ long, ¼′–3½′ wide, often turning red; flowers mostly in axillary capitate clusters, often dense, or some in few terminal spikes; fruiting bractlets broadly ovate or triangular-hastate, strongly veined, mealy-white, dry, about 3″ broad, united only at their bases, their margins toothed or lacerate and sides tubercled.

In waste places and ballast, Nova Scotia to northern New York and New Jersey. Adventive from Europe. Aug.–Oct.

4. Atriplex argéntea Nutt. Silvery Orache. (Fig. 1381.)

Atriplex argentea Nutt. Gen. 1: 198. 1818.

Annual, pale, densely silvery-scurfy or becoming smooth, stem erect or ascending, bushy-branched, 6′–20′ high, angular. Leaves firm, triangular-hastate or rhombic-ovate, mostly acute at the apex, narrowed or subtruncate at the base, petioled or the upper sessile, entire or sparingly dentate, ½′–2′ long, the basal lobes short; flowers in capitate axillary clusters, or the staminate in short dense spikes; fruiting bractlets suborbicular, rhombic or broader than high, 2″–4″ wide, united nearly to their summits, the margins sharply toothed, the sides sometimes tubercled or crested; radicle of the embryo pointing downward.

In dry or saline soil, Minnesota to the Northwest Territory, south to Nebraska, Colorado and Utah. June–Sept.

5. Atriplex expánsa S. Wats. Sessile-leaved Orache. (Fig. 1382.)

Atriplex expansa S. Wats. Proc. Am. Acad. 9: 116. 1874.

Annual, densely silvery-scurfy, similar to the preceding species, but stouter, the stem erect, widely branched, sometimes 6° tall. Leaves thin, triangular-hastate or rhombic-ovate, toothed or entire, sessile or the lower very short-petioled, ½′–1½′ long and nearly as wide at the base; pistillate flowers in axillary clusters, the staminate mostly in slender interrupted solitary or panicled spikes sometimes 4′ long; fruiting bractlets broad, united nearly to their summits, tubercled, their margins strongly toothed.

Western Kansas (according to A. S. Hitchcock) to Chihuahua and New Mexico, west to California. July–Oct.

6. Atriplex arenària Nutt. Sea-beach Atriplex. (Fig. 1383.)

Atriplex arenaria Nutt. Gen. 1: 198. 1818.

Annual, pale, densely silvery-scurfy, stem bushy-branched, 6′–18′ high, the branches ascending or decumbent, angular, slender. Leaves oblong, entire, acute or obtuse and mucronulate at the apex, narrowed or rounded at the base, very short-petioled or sessile, ½′–1½′ long, 2½″–10″ wide, the midvein rather prominent, the lateral veins few and obscure; flowers in axillary clusters much shorter than the leaves; fruiting bractlets triangular wedge-shaped, broadest above, 2″–3″ wide, united nearly to the several-toothed summits, their margins entire, their sides reticulated, or sometimes crested or tubercled; radicle of the embryo pointing downward.

On sandy sea beaches, Nova Scotia (?); Massachusetts to Florida. July–Sept.

7. Atriplex Nuttàllii S. Wats. Nuttall's Atriplex. (Fig. 1384.)

Atriplex Nuttallii S. Wats. Proc. Am. Acad. 9: 116. 1874.

A finely scurfy pale green shrub, 1°–2½° tall, the branches erect or ascending, rather stiff, striate or terete, leafy, the bark nearly white. Leaves oblong, linear-oblong or oblanceolate, obtuse or subacute at the apex, narrowed at the base, sessile, entire, ½′–2′ long, 2″–5″ wide; flowers in terminal spikes and capitate clustered in the axils, often strictly dioecious; fruiting bractlets ovate or suborbicular, united to above the middle, 1½″–2½″ broad, the margins toothed, the sides crested, tubercled or spiny.

In dry or saline soil, Manitoba to the Northwest Territory, south to Nebraska, Colorado and Nevada. Aug.–Oct.

8. Atriplex canéscens (Pursh) James. Bushy Atriplex. (Fig. 1385.)

Calligonum canescens Pursh, Fl. Am. Sept. 370. 1814.

Atriplex canescens James, Trans. Am. Phil. Soc. (II.) 2: 178. 1825.

A pale densely scurfy shrub, 1°–3° high, resembling the preceding species and with similar foliage. Flowers in short terminal spikes and in axillary clusters, commonly dioecious, sometimes monoecious; bractlets ovate in flower, united nearly to their summits; in fruit appendaged by 4 broad thin distinct wings, which are 2″–4″ broad at the middle and usually about twice as high, strongly reticulate-veined, not tubercled nor crested, toothed near their summits or entire.

In dry or saline soil, South Dakota and Nebraska to New Mexico and Mexico, west to Nevada and California. July–Sept.

7. EURÒTIA Adans. Fam. Pl. 2: 260. 1763.

Pubescent perennial herbs or low shrubs, with alternate entire narrow leaves and monoecious or dioecious flowers, capitate or spicate in the axils. Staminate flowers not bracteolate, consisting of a 4-parted calyx and as many exserted stamens. Pistillate flowers 2-bracteolate, the bractlets united nearly or quite to their summits, densely covered with long silky hairs, 2-horned; calyx none; ovary ovoid, sessile, pubescent; styles 2, exserted. Seed vertical; embryo nearly annular in the mealy endosperm, its radicle pointing downward. [From the Greek for hoariness or mould.]

Two known species, the following of western North America, the other of western Asia and eastern Europe.

1. **Eurotia lanàta** (Pursh) Moq. American Eurotia. White Sage. (Fig. 1386.)

Diotis lanata Pursh, Fl. Am. Sept. 602. 1814.
Eurotia lanata Moq. Enum. Chenop. 81. 1840.

A stellate-pubescent erect much-branched shrub 1°–3° high, the hairs long, white when young, becoming reddish brown, the branches ascending, very leafy. Leaves linear or linear-lanceolate, short-petioled or the upper sessile, obtuse at the apex, narrowed at the base, ½′–2′ long, 2″–4½″ wide, their margins revolute, the midvein prominent, the lateral veins few; flowers densely capitate in the upper axils, forming terminal leafy spikes; bracts lanceolate, 2″–4″ long in fruit, appendaged by 4 tufts of spreading hairs; calyx-lobes acute, pubescent; utricle loose, the pericarp readily separating from the large seed.

In dry soil, Northwest Territory to western Nebraska and New Mexico, Nevada and California. June–Sept.

8. KÒCHIA Roth; Schrad. Journ. Bot. 1: 307. *pl. 2.* 1799.

Perennial or annual herbs or low shrubs, with alternate sessile narrow entire leaves, and perfect or pistillate flowers, sometimes bracteolate, clustered in the axils. Calyx 5-lobed, herbaceous or membranous, wingless, or sometimes developing a horizontal wing, enclosing the fruit. Stamens 3–5, their filaments linear. Ovary ovoid, narrowed upward into the style; stigmas 2. Utricle pear-shaped or oblong, the pericarp membranous, not adherent to the seed. Seed inverted; the testa thin; embryo annular; endosperm little or none. [Name in honor of W. D. J. Koch, 1771–1849, Director of the Botanical Garden at Erlangen.]

About 35 species, mostly natives of the Old World, the following introduced from Europe. An indigenous species, *K. Americana*, occurs in the western United States.

1. **Kochia Scopària** (L.) Roth. Kochia. (Fig. 1387.)

Chenopodium Scoparia L. Sp. Pl. 221. 1753.
Kochia Scoparia Roth; Schrad. Neues Journ. Bot. 3: 85. 1809.

Annual, pubescent or becoming glabrate, stem erect, slender, rather strict, branched, leafy, 1°–2½° tall. Leaves linear-lanceolate or linear, ciliate, acuminate at the apex, 1′–2′ long, 1″–2″ wide, the upper gradually smaller; flowers sessile, solitary in the axils of the upper leaves, forming short dense bracted spikes; fruiting calyx-segments each with a short triangular horizontal wing.

In waste places, Ontario, Vermont and northern New York. Adventive from Europe. Native also of Asia. July–Sept.

9. CORISPÉRMUM L. Sp. Pl. 4. 1753.

Annual herbs, with alternate narrow entire 1-nerved leaves, and perfect bractless small green flowers, solitary in the upper axils, forming terminal narrow leafy spikes, the upper leaves shorter and broader than the lower. Calyx of a solitary thin broad sepal, or rarely 2. Stamens 1–3, rarely more, and one of them longer. Ovary ovoid; styles 2. Utricle ellipsoid, mostly plano-convex, the pericarp firmly adherent to the vertical seed, its margins acute or winged. Embryo annular in the somewhat fleshy endosperm, its radicle pointing downward. [Greek, bug-seed.]

About 10 species, natives of the north temperate and subarctic zones. Only the following is known to occur in North America.

1. Corispermum hyssopifòlium L. Bug-seed. (Fig. 1388.)

Corispermum hyssopifolium L. Sp. Pl. 4. 1753.

Glabrous or pubescent, rather pale green, somewhat fleshy, stem striate, erect, sometimes zigzag, usually much branched, 6′–2° tall, the branches slender, ascending or divergent, sparingly leafy. Leaves narrowly linear, sessile, ½′–2′ long, 1″–2″ wide, cuspidate at the apex; upper leaves ovate or lanceolate, appressed-ascending, or at length spreading, acute or acuminate at the apex, ¼′–½′ long, scarious-margined; utricle 1″–2″ long, ½″–1″ thick, narrowly winged, obtuse, subacute or mucronate by the persistent styles.

In sandy soil, shores of the Great Lakes to the Northwest Territory, Arctic America and British Columbia, south to Kansas, Texas and Arizona. Also in Europe and Asia. The small-fruited form (var. *microcarpum* S. Wats.) occurs from Kansas southward. July–Sept.

10. SALICÒRNIA L. Sp. Pl. 3. 1753.

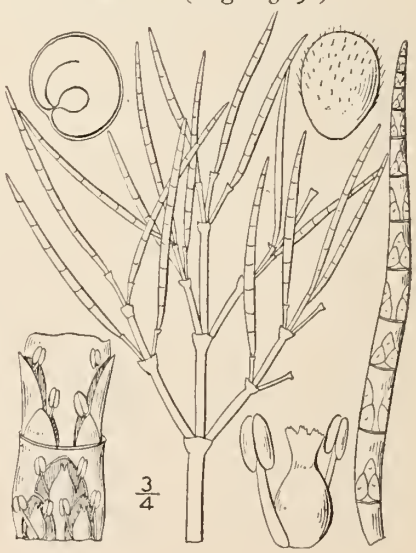
Fleshy glabrous annual or perennial herbs, with opposite terete branches, the leaves reduced to mere opposite scales at the nodes, the flowers sunken 3–7 together in the axils of the upper ones, forming narrow terminal spikes, perfect or the lateral ones staminate. Calyx obpyramidal or rhomboid, fleshy, 3–4-toothed or truncate, becoming spongy in fruit, deciduous. Stamens 2, or sometimes solitary, exserted; filaments cylindric, short; anthers oblong, large; ovary ovoid; styles or stigmas 2. Utricles enclosed by the spongy fruiting calyx, the pericarp membranous. Seed erect, compressed; embryo conduplicate; endosperm none. [Name Greek, salt-horn; from the saline habitat, and horn-like branches.]

About 10 species, natives of saline soil, widely distributed in both the Old World and the New. Only the following are known to inhabit North America.

Annuals; stem erect.
- Scales very short, acute or blunt; spikes 1″–1½″ in diameter. 1. *S. herbacea.*
- Scales mucronate-tipped; spikes 2″–3″ in diameter. 2. *S. Bigelovii.*

Perennial by a woody rootstock; stems trailing or decumbent. 3. *S. ambigua.*

1. Salicornia herbàcea L. Slender Glasswort. (Fig. 1389.)



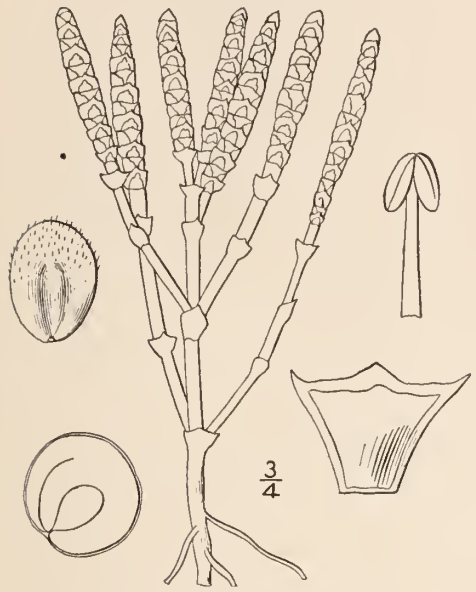
Salicornia Europaea var. *herbacea* L. Sp. Pl. 3. 1753.

Salicornia herbacea L. Sp. Pl. Ed. 2, 5. 1762.

Annual, 6′–2° tall, stem erect, much branched, the branches slender, ascending or nearly upright, their joints 2–4 times as long as thick. Scales acute or rather obtuse, 1″ long or less, broadly ovate or wider than long; fruiting spikes 1′–3′ long, about 1½″ in diameter; middle flower of the 3 at each joint twice as high as the lateral ones, reaching nearly to the top of the joint; utricle pubescent.

In salt marshes, Anticosti to Georgia; about salt springs in central New York; in saline soil from Manitoba to British Columbia, south to Kansas and Utah. Also in Europe and Asia. The plant often turns bright red in autumn, forming vividly colored areas in the salt marshes, hence called Marsh Samphire. July–Sept.

2. Salicornia Bigelòvii Torr. Bigelow's Glasswort. (Fig. 1390.)



Salicornia mucronata Bigel. Fl. Bost. Ed. 2, 2. 1824. Not Lag. 1817.

Salicornia Virginica Moq. in DC. Prodr. 13: Part 2, 145. 1849. Not L. 1753.

Salicornia Bigelovii Torr. Bot. Mex. Bound. Surv. 184. 1859.

Annual, stem and branches stout, erect or nearly so, 2′–12′ tall. Scales ovate or triangular-ovate, sharply mucronate, 1″–1½″ long, at length spreading; fruiting spikes ½′–2½′ long, 2″–3″ in diameter, their joints not longer than thick; middle flower slightly higher than the lateral ones, reaching very nearly to the end of the joint; utricle pubescent.

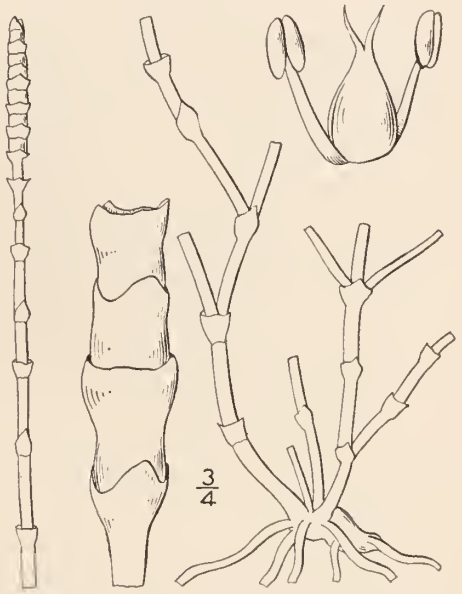
In salt marshes, Nova Scotia to Florida and Texas. Plant bright red in autumn. July-Sept.

3. Salicornia ambígua Michx. Woody Glasswort. (Fig. 1391.)

Salicornia ambigua Michx. Fl. Bor. Am. 1: 2. 1803.

Perennial by a woody rootstock, stem trailing or decumbent, 6′–2° long, the branches ascending or erect, slender, nearly or quite simple, rather long-jointed, 3′–8′ long. Scales broadly ovate or wider than high, acute or obtuse, appressed or slightly divergent; fruiting spikes ½′–1½′ long, about 2″ in diameter, their joints not longer than thick; flowers all about equally high and about equalling the joints.

On sea beaches and salt meadows, Massachusetts to Florida and Texas, and on the Pacific Coast. Perhaps identical with *S. fruticosa* L., of Europe. Aug.–Sept.



11. SARCÓBATUS Nees in Max. Reise N. A. 1: 510. 1839.

An erect much branched shrub, with spiny branches, alternate linear fleshy entire sessile leaves. Flowers monoecious or dioecious, the staminate in terminal ament-like spikes, the pistillate solitary in the axils, or rarely several together. Staminate flowers without a calyx; stamens 2–5 together under peltate rhombic-ovate acute spirally arranged scales; filaments short. Pistillate flowers sessile or very nearly so; calyx compressed, ovoid or oblong, slightly 2-lipped, adnate to the bases of the 2 subulate exserted papillose stigmas, appendaged by a narrow border which expands into a membranous horizontal wing in fruit. Seed vertical, the testa translucent, double; embryo coiled into a flat spiral, green; endosperm none. [Name Greek, flesh-thorn, from the fleshy leaves and thorny stems.]

A monotypic genus of western North America.

1. Sarcobatus vermiculàtus (Hook.) Torr. Grease-wood. (Fig. 1392.)

Batis (?) *vermiculata* Hook. Fl. Bor. Am. 2: 128. 1838.
Sarcobatus vermicularis Torr. Emory's Rep. 150. 1848.

Glabrous or the young foliage somewhat pubescent, much branched, 2°–10° high, the branches slightly angled, leafy, nearly white, some of them leafless and spine-like. Stem 1′–3′ in diameter; wood yellow, very hard; leaves obtuse or subacute, ½′–1½′ long, 1″–1½″ wide, narrowed at the base; spikes of staminate flowers ¼′–1′ long, 1½″–2″ in diameter, cylindric, short-peduncled or sessile; wing of the calyx 4″–6″ broad when mature, conspicuously veined.

In dry alkaline and saline soil, western Nebraska, Wyoming to Nevada and New Mexico. Wood extensively used for fuel, for want of better, in the regions where it occurs. June–July. Fruit mature Sept.–Oct.

12. DÓNDIA Adans. Fam. Pl. 2: 261. 1763.

[SUAEDA Forsk. Fl. AEg. Arab. 69. *pl. 18b.* 1775.]

Fleshy annual or perennial herbs, or low shrubs, with alternate narrowly linear thick or nearly terete entire sessile leaves, and perfect or polygamous bracteolate flowers, solitary or clustered in the upper axils. Calyx 5-parted or 5-cleft, the segments sometimes keeled or even slightly winged in fruit, enclosing the utricle. Stamens 5. Styles usually 2, short. Pericarp separating from the vertical or horizontal seed. Embryo coiled into a flat spiral. Endosperm wanting or very little. [In honor of Jacopodi Dondi, Italian naturalist of the fourteenth century.]

About 50 species, of wide geographic distribution. Besides the following, some 6 others occur in the western and southern parts of North America.

Annuals of the Atlantic sea coast.
Dark green, not glaucous; sepals acutely keeled; seed black. 1. *D. Americana.*
Light green, glaucous; sepals scarcely keeled; seed dark red. 2. *D. maritima.*
Perennial of the western plains. 3. *D. depressa.*

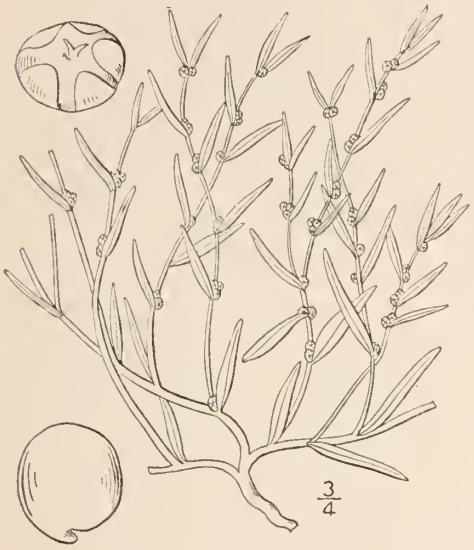
1. Dondia Americàna (Pers.) Britton. Tall Sea-Blite. (Fig. 1393.)

Salsola salsa var. *Americana* Pers. Syn. 1: 296. 1805.
Suaeda linearis var. *ramosa* S. Wats. Proc. Am. Acad. 9: 87. 1874.

Annual, dark green or purplish green, not glaucous, stem erect, strict, 1°–3° tall, pale green or nearly white, branched, the branches slender, very leafy, erect-ascending or sometimes recurved, more or less secund. Leaves of the stem linear-subulate, ½′–1½′ long, those of the branches much shorter, somewhat 3-angled, lanceolate-subulate, widest just above the base, the upper surface flat; sepals purple-green, glaucous, acutely keeled or almost winged; seed orbicular, black, shining, ½″ broad.

On salt marshes and along salt water ditches, Nova Scotia to New Jersey and probably further south. Aug.–Sept.

2. Dondia marítima (L.) Druce. Low Sea-Blite. (Fig. 1394.)



Chenopodium maritimum L. Sp. Pl. 221. 1753.
Suaeda maritima Dumort. Fl. Belg. 22. 1827.
Dondia maritima Druce, Ann. Scot. Nat. Hist. 1896: 42. 1896.

Annual, pale green and somewhat glaucous, stem erect or decumbent, bushy-branched, 5′–15′ high, becoming brownish, the branches ascending. Leaves 5″–12″ long, those of the branches not conspicuously shorter than the upper ones of the stem, 3-angled, broadest at the base; sepals pale green, rounded or very obtusely keeled, somewhat roughened; seed orbicular, dark brownish red, shining, about 1″ in diameter.

On sea beaches, stony and muddy shores, and in salt marshes, Maine to southern New York. Also on the coasts of Europe. Our plant is, perhaps, specifically different from the European. July–Sept.

3. Dondia depréssa (Pursh) Britton. Western Blite. (Fig. 1395.)

Salsola depressa Pursh, Fl. Am. Sept. 197. 1814.

Suaeda depressa S. Wats. Bot. King's Exp. 294. 1871.

Perennial by a deep slender woody root or sometimes annual, branched from the base and usually also above, 6′–2° tall, the branches decumbent or ascending, usually very leafy. Leaves narrowly linear, ½′–1′ long, broadest at or just above the base, or the upper lanceolate or ovate-lanceolate and commonly much shorter; sepals acute, one or more of them strongly keeled in fruit; seed about ½″ in diameter, rather dull, minutely reticulated.

In saline soil, Minnesota to the Northwest Territory, south to Nebraska, Colorado and Nevada. June–Aug.

13. SÁLSOLA L. Sp. Pl. 222. 1753.

Annual or perennial bushy-branched herbs, with rigid subulate prickle-pointed leaves, and sessile perfect 2-bracteolate flowers, solitary in the axils, or sometimes several together. Calyx 5-parted, its segments appendaged by a broad membranous horizontal wing in fruit and enclosing the utricle. Stamens 5. Ovary depressed; styles 2. Utricle flattened. Seed horizontal; embryo coiled into a conic spiral; endosperm none. [Name Latin, a diminutive of salsus, salty.]

About 50 species, of wide geographic distribution on seashores and in saline districts, occasionally pernicious weeds in cultivated grounds.

Calyx coriaceous, not conspicuously veined; plant maritime. 1. *S. Kali.*
Calyx membranous, very strongly veined; plant an inland weed. 2. *S. Tragus.*

1. Salsola Kàli L. Saltwort. (Fig. 1396.)

Salsola Kali L. Sp. Pl. 222. 1753.

Annual, glabrous or often pubescent, loosely much branched, 1°–2° high, the branches ascending or spreading, mostly stout, somewhat ridged. Leaves dull green or grayish, 3″–10″ long, succulent, lanceolate-subulate, swollen at the base, the midvein excurrent into a stout yellowish green prickle; flowers solitary in the axils; wing of the persistent calyx nearly orbicular, lobed, becoming lacerate, not conspicuously veined, 2″–4″ in diameter; calyx coriaceous, not conspicuously veined, its wing not longer than the ascending lobe.

On sea beaches, Cape Breton Island to Florida. Also in Europe and Asia. July-Sept.

2. Salsola Tràgus L. Russian Thistle. (Fig. 1397.)

Salsola Tragus L. Sp. Pl. Ed. 2, 322. 1762.
Salsola Kali var. *Tragus* Moq. in DC. Prodr. 13: Part 2, 187. 1849.

Similar to the preceding species, but bushy branched, the branches usually slender. Leaves and outer branches usually bright red at maturity; leaves not noticeably swollen at the base, linear, prickle-tipped, less fleshy; calyx membranous, conspicuously veiny, its wing longer than the ascending lobe.

In cultivated fields and waste places, New Jersey to Ontario, the Northwest Territory and Kansas. A very troublesome weed in many parts of the Central and Western States. Naturalized from northern Europe or Asia. July-Sept.

Family 16. **AMARANTHÀCEAE** J. St. Hil. Expos. Fam. 1: 204. 1805.

Amaranth Family.

Herbs, some exotic genera low shrubs, with alternate or opposite simple mostly entire thin leaves. Flowers small, green or white, perfect, monoecious, polygamous, or dioecious, bracteolate, variously clustered, usually in terminal spikes or axillary heads. Petals none. Calyx herbaceous or membranous, 2–5-parted, the segments distinct or united at the base, equal, or the inner ones smaller. Stamens 1–5, mostly opposite the calyx-segments, hypogynous; filaments distinct, united at the base, or into a tube; anthers 1-celled or 2-celled. Ovary ovoid or subglobose, 1-celled; ovule solitary in the following genera, amphitropous (several in some tropical genera); style short, elongated or none; stigmas 1–3. Fruit a utricle, circumscissile, bursting irregularly or indehiscent, 1-seeded in our genera. Seed mostly smooth; embryo annular; endosperm mealy, usually copious.

About 40 genera and 425 species, widely distributed, most abundant in warm regions.

Anthers 2-celled; leaves alternate.	
Calyx 5-parted or of 5 sepals.	1. *Amaranthus.*
Calyx of the pistillate flowers wanting.	2. *Acnida.*
Anthers 1-celled; leaves opposite.	
Flowers in small axillary clusters.	3. *Cladothrix.*
Flowers variously spicate or paniculate.	
Calyx 5-cleft; filaments united into a tube.	4. *Froelichia.*
Calyx 5-parted; filaments united at the base.	5. *Iresine.*

1. AMARÁNTHUS L. Sp. Pl. 989. 1753.

Annual branched erect or diffusely spreading glabrous or pubescent herbs, most of the species weeds, with alternate, petioled pinnately veined entire, undulate or crisped leaves and small monoecious polygamous or dioecious green or purplish mostly 3-bracteolate flowers in dense terminal spikes or axillary clusters. Calyx of 2–5 distinct sepals. Stamens 2–5; anthers 2-celled, longitudinally dehiscent. Styles or stigmas 2 or 3. Fruit an ovoid or oblong utricle, circumscissile, bursting irregularly or indehiscent, 2–3 beaked by the persistent styles. Embryo annular. [Greek, unfading flower, from the dry, unwithering bracts.]

About 50 species of wide geographic distribution. Besides the following some 22 others occur in the southern and western United States.

Utricle circumscissile; the top falling away as a lid.
- Flowers, at least the upper, in dense terminal spikes.
  - Axils not spine-bearing.
    - Spikes stout, 4″–7″ thick. — 1. *A. retroflexus.*
    - Spikes slender, 2″–3″ thick. — 2. *A. hybridus.*
  - A pair of stout spines in each axil. — 3. *A. spinosus.*
- Flowers all in small axillary clusters, mostly shorter than the leaves.
  - Plant prostrate; sepals 4 or 5. — 4. *A. blitoides.*
  - Plant erect, bushy-branched; sepals 3. — 5. *A. graecizans.*

Utricle indehiscent, membranous, coriaceous or fleshy.
- Upper flowers in terminal, more or less elongated spikes.
  - Sepals 5, clawed; flowers dioecious; southwestern species.
    - Bracts cuspidate-tipped, short. — 6. *A. Torreyi.*
    - Bracts subulate, long and sharp. — 7. *A. Palmeri.*
  - Sepals 2 or 3, oblong or spatulate; flowers monoecious or polygamous; in waste places.
    - Utricle smooth, dry, scarious. — 8. *A. lividus.*
    - Utricle fleshy, 3–5-nerved. — 9. *A. deflexus.*
- Flowers all in small axillary clusters shorter than the leaves.
  - Plant not fleshy; stem prostrate; leaves crisped. — 10. *A. crispus.*
  - Sea-coast fleshy plant; stem short, erect; leaves not crisped. — 11. *A. pumilus.*

1. Amaranthus retrofléxus L. Rough Pigweed. (Fig. 1398.)

Amaranthus retroflexus L. Sp. Pl. 991. 1753.

Roughish-puberulent, rather light green, stem stout, erect or ascending, commonly branched, 1°–10° tall. Leaves ovate, rhombic-ovate or the upper lanceolate, slender-petioled, acute or acuminate at the apex, narrowed or cuneate at the base, the larger 3′–6′ long, their margins undulate or entire; flowers green, densely aggregated in terminal and axillary spikes, which are sessile, stout, obtuse or subacute, ovoid-cylindric, erect or ascending, ½′–2½′ long, 4″–7″ thick; bracts subulate, twice as long as the 5 scarious narrowly oblong or slightly spatulate mucronate-tipped and often emarginate sepals; stamens 5; utricle slightly wrinkled, thin, circumscissile, rather shorter than the sepals.

A weed, in cultivated and waste soil, throughout North America except the extreme north. Also in Europe. Naturalized from tropical America. Aug.–Oct.

2. Amaranthus hýbridus L. Slender Pigweed. (Fig. 1399.)

Amaranthus hybridus L. Sp. Pl. 990. 1753.
Amaranthus hypochondriacus L. Sp. Pl. 991. 1753.
A. chlorostachys Willd. Amaranth. 34. *pl. 10. f. 19.* 1790.
Amarantus chlorostachys var. *hybridus* S. Wats. in A. Gray, Man. Ed. 6, 428. 1890.

Similar to the preceding species but darker green, or purple, pubescent or nearly glabrous; stem usually slender, erect, usually branched, 2°–8° tall. Leaves bright green on both sides or paler beneath, usually smaller, slender-petioled; spikes linear-cylindric, axillary and forming dense terminal panicles, ascending, somewhat spreading or drooping; bracts subulate, twice as long as the 5 oblong acute or cuspidate sepals; stamens 5; utricle scarcely wrinkled, circumscissile.

A weed, in waste grounds, range of the preceding species. Naturalized from tropical America. Aug.–Oct.

Amaranthus hýbridus paniculàtus (L.) Uline & Bray, Mem. Torr. Club, 5: 145. 1894.
Amaranthus paniculatus L. Sp. Pl. Ed. 2, 1406. 1763.
Flowers and foliage more or less deeply tinged with red or purple; leaves sometimes lanceolate and bracts shorter. Range of the type, but less abundant.

3. Amaranthus spinòsus L. Spiny Amaranth. (Fig. 1400.)

Amaranthus spinosus L. Sp. Pl. 991. 1753.

Rather dark green, glabrous or somewhat pubescent above, stem stout, erect or ascending, ridged, usually much branched, sometimes red, 1°–4° high. Leaves ovate, rhombic-ovate or the upper lanceolate, slender-petioled, acute at both ends, 1′–3′ long, with a pair of rigid stipular spines ¼′–1′ long at each node, the midvein excurrent; flowers in numerous capitate axillary clusters, mostly shorter than the petioles and in dense terminal linear-cylindric spreading or drooping spikes 1′–6′ long; bracts lanceolate-subulate about as long as the 5 scarious oblong mucronate-tipped 1-nerved sepals, and the thin imperfectly circumscissile utricle; stamens 5.

In waste and cultivated soil, Massachusetts to Pennsylvania, Ohio and Kansas, south to Florida and Mexico. Naturalized from tropical America. A troublesome weed southward. June–Sept.

4. Amaranthus blitoìdes S. Wats. Prostrate Amaranth. (Fig. 1401.)

A. blitoides S. Wats. Proc. Am. Acad. 12: 273. 1877.

Nearly or quite glabrous, rather pale green, stem diffusely branched, prostrate and spreading on the ground, ridged, 6′–2° long, often forming mats. Leaves obovate or spatulate, ¼′–1′ long, obtuse or acute at the apex, narrowed into slender petioles, sometimes longer than the blades; flowers in small axillary clusters mostly shorter than the petioles; bracts lanceolate-subulate, little longer than the 4 or 5 oblong-lanceolate acute or cuspidate sepals; stamens 3; utricle nearly smooth, circumscissile, equalling or slightly longer than the sepals.

In waste places, especially along the principal routes of travel, Maine to southern Ontario and Minnesota, south to New Jersey, Missouri and Kansas. Naturalized from west of the Rocky Mountains, where it appears to be indigenous from Utah and Colorado to Mexico. June–Oct.

5. Amaranthus graecìzans L. Tumble-weed. (Fig. 1402.)

Amaranthus graecizans L. Sp. Pl. 990. 1753.
Amaranthus albus L. Sp. Pl. Ed. 2, 1404. 1763.

Glabrous, pale green, stem erect, bushy-branched, whitish, 6′–2° tall, the branches slender, ascending. Leaves oblong, spatulate or obovate, ½′–1½′ long, slender-petioled, papillose, the midvein excurrent; flowers polygamous, several together in small axillary clusters shorter than the leaves, commonly not longer than the petioles; bracts subulate, pungent-pointed, spreading, much longer than the 3 membranous sepals; stamens 3; utricle wrinkled, circumscissile, longer than the sepals.

In waste and cultivated soil, throughout North America. Naturalized from tropical America. The leaves fall away in autumn, and on the western plains the plant, thus denuded, is freely uprooted and blown before the wind, whence the popular name. June–Sept.

6. Amaranthus Tórreyi (A. Gray) Benth. Torrey's Amaranth. (Fig. 1403.)

Amblogyne Torreyi A. Gray, Proc. Am. Acad. 5: 167. 1861.

Amarantus Torreyi Benth.; S. Wats. Bot. Cal. 2: 42. 1880.

Glabrous or nearly so, stem stout or slender, erect, grooved, usually much branched above, 2°–3° tall. Leaves lanceolate or rhombic-lanceolate, thin, narrowed above to a rather blunt apex, mostly cuneate at the base, 1½′–4′ long, ¼′–1′ wide, slender-petioled; flowers dioecious, borne in terminal slender sometimes panicled spikes and in small axillary clusters; bracts shorter than or about equalling the 5 sepals, cuspidate; sepals of the pistillate flowers obovate or broadly spatulate, clawed, obtuse or emarginate, those of the staminate flowers narrower and subacute; utricle dry, indehiscent.

In dry soil, western Nebraska to Nevada, south to Mexico. Plant with the aspect of *Acnida*. June–Aug.

7. Amaranthus Pàlmeri S. Wats. Palmer's Amaranth. (Fig. 1404.)

Amaranthus Palmeri S. Wats. Proc. Am. Acad. 12: 274. 1876.

Somewhat similar to the preceding species, stem erect, slender, branched, 2°–3° tall, usually pubescent above. Leaves ovate, rhombic-ovate or the upper lanceolate, blunt at the apex, narrowed at the base, prominently veined, slender-petioled, the lower petiole often longer than the blades; flowers dioecious, borne in elongated erect or drooping spikes often 1′ long or more, and some of them commonly in small clusters in the upper axils; bracts subulate, spiny-awned, spreading, twice as long as the sepals; sepals 5, spatulate, clawed; utricle dry, indehiscent.

In dry soil, western Kansas (according to A. S. Hitchcock) to Texas and Mexico, west to California. June–Sept.

8. Amaranthus lívidus L. Purplish Amaranth. (Fig. 1405.)

Amaranthus lividus L. Sp. Pl. 990. 1753.

Euxolus lividus Moq. in DC. Prodr. 13: Part 2, 275. 1849.

Glabrous, rather succulent, purplish-green, stem erect, slender, branched, 1°–3° tall. Leaves ovate, entire, 1′–3′ long, strongly emarginate at the apex, narrowed at the base, slender-petioled; flowers monoecious or polygamous, in dense terminal spikes and in capitate axillary clusters usually much shorter than the petioles; bracts shorter than the 2 or 3 oblong or spatulate sepals; utricle dry, scarious, smooth, indehiscent, longer than the sepals.

In waste places, eastern Massachusetts to southern New York. Adventive from tropical America. July–Sept.

9. Amaranthus deflexus L. Low Amaranth. (Fig. 1406.)

Amaranthus deflexus L. Mant. 2: 295. 1771.
Euxolus deflexus Raf. Fl. Tell. 3: 42. 1836.

Glabrous, purplish-green, rather succulent, stem usually much branched, erect, stout or slender, 1°–3° tall. Leaves ovate or oval obtuse retuse or emarginate at the apex, mostly narrowed at the base, 1′–3′ long, ½′–1½′ wide, slender-petioled, the petioles often as long as the blades or the lower ones longer; flowers polygamous in dense, mostly short and thick terminal spikes and capitate in the axils; bracts shorter than the 2 or 3 oblong or spatulate sepals usually very short; utricle fleshy, 3–5-nerved, smooth, indehiscent, rather shorter than the sepals.

In waste places and ballast along the coast, Massachusetts to southern New York. Also in California. Probably adventive from tropical America. July–Sept.

10. Amaranthus crispus (Lesp. & Thev.) Braun. Crisp-leaved Amaranth. (Fig. 1407.)

Euxolus crispus Lesp. & Thev. Bull. Soc. Bot. France, 6: 656. 1859.

Amarantus crispus Braun; A. Gray, Man. Ed. 6, 428. 1890.

Pubescent, stem copiously branched, slender, spreading on the ground, prostrate, forming mats 8′–2½° in diameter. Leaves oblong or lanceolate, mostly acute at the apex and narrowed at the base, petioled, 4″–1′ long, their margins remarkably crisped; petioles shorter than or exceeding the blades; flowers all in small axillary clusters shorter than the petioles; bracts lanceolate, cuspidate, shorter than the 5 spatulate spreading sepals; stamens (always?) 3; utricle wrinkled, indehiscent, about as long as the sepals.

In waste places, New York city, Brooklyn and Albany, N. Y. Also in France. Native region unknown. June–Sept.

11. Amaranthus pumilus Raf. Coast Amaranth. (Fig. 1408.)

Amarantus pumilus Raf. Med. Rep. (II.) 5: 360. 1808.
Euxolus pumilus Chapm. Fl. S. States, 381. 1860.

Glabrous, fleshy, branched, the branches prostrate or ascending, 3′–8′ long. Leaves ovate, rhombic-ovate or suborbicular, most of them clustered toward the ends of the branches, obtuse or emarginate at the apex, narrowed or rounded at the base, prominently veined, petioled, 3″–10″ long, the veins often purple; flowers few together in small axillary clusters; bracts lanceolate, subacute, shorter than the 5 oblong obtuse sepals; stamens 5; anthers yellow; utricle fleshy, indehiscent, faintly 5-ribbed, slightly wrinkled, nearly twice as long as the sepals when mature; seed very large for the genus.

On sea beaches, Rhode Island to North Carolina. June–Sept.

2. ACNÌDA L. Sp. 1027. 1753.

Annual, erect or decumbent, glabrous branching herbs, similar to the dioecious Amaranths, with alternate petioled thin pinnately veined leaves. Flowers small, green, 1–3-bracted, in terminal and axillary, continuous or interrupted spikes, or clustered in the axils. Staminate flowers consisting of 5 scarious erect 1-nerved mucronate sepals longer than the bracts, and as many stamens; filaments subulate, distinct; anthers 2-celled. Pistillate flowers without a calyx; ovary ovoid or subglobose; stigmas 2–5, papillose or plumose, short or elongated. Utricle fleshy and indehiscent, or membranous and bursting irregularly or circumscissile; seed erect, smooth and shining. [Greek, without nettle.]

About 4 species, natives of eastern North America and the West Indies.

Utricle fleshy, angled, indehiscent; salt-marsh plant. 1. *A. cannabina.*
Utricle membranous, dehiscent or indehiscent, not angled; plants of fresh water swamps. 2. *A. tamariscina.*

1. Acnida cannábina L. Salt-marsh Water-hemp. (Fig. 1409.)

Acnida cannabina L. Sp. Pl. 1027. 1753.
A. rusocarpa Michx. Fl. Bor. Am. 2: 234. *pl. 50.* 1803.

Succulent, stem stout or slender (sometimes 1′ in diameter at the base), usually much branched, 1°–10° tall, the branches ascending. Leaves lanceolate, acuminate but generally blunt-pointed and apiculate at the apex, 2′–6′ long, ¼′–1¼′ wide, narrowed at the base, entire or slightly undulate; petiole usually shorter than the blade; staminate spikes 1′–5′ long, usually dense; sepals oblong-lanceolate or ovate-oblong, acute, acuminate or obtusish, cuspidate or mucronate; fertile spikes dense or loose; stigmas slender, papillose-hispid, ½″ long; utricle fleshy, indehiscent, 3–5-angled, subglobose or obovoid, 1″–2″ long when mature, becoming black, much longer than the bracts.

In salt and brackish marshes, and up the rivers to fresh water, Massachusetts to Florida. July–Aug.

Acnida Floridàna S. Wats. Proc. Am. Acad. 10: 376, a more slender plant, of the southern Atlantic coast, with narrower slender-petioled leaves, the flowers in elongated interrupted spikes, and a smaller utricle, may occur in southern Virginia.

2. Acnida tamariscina (Nutt.) Wood. Western Water-hemp. (Fig. 1410.)

Amarantus tamariscinus Nutt. Trans. Am. Phil. Soc. (II.) 5: 165. 1833–37.
Acnida tamariscina Wood, Bot. & Fl. 289. 1873.

Similar to the preceding species, much branched, erect, the branches usually slender, erect-ascending. Leaves lanceolate or ovate-lanceolate, 2′–6′ long, mostly long-acuminate, but sometimes obtuse at the apex and mucronate or cuspidate-tipped, narrowed at the base, the petioles commonly shorter than the blades; spikes mostly loose or interrupted, often 5′ long; sepals lanceolate, subulate-acuminate; stigmas plumose, rather short; utricle membranous, not angled, ½″–1″ long, circumscissile; bractlets lanceolate, cuspidate.

In swamps, Illinois to South Dakota, Louisiana and New Mexico. July–Sept.

Acnida tamariscina tuberculàta (Moq.) Uline & Bray, Bot. Gaz. 20: 157. 1895.
Acnida tuberculata Moq. in DC. Prodr. 13: Part 2, 278. 1849.
Acnida tamariscina var. *subnuda* S. Wats. in A. Gray, Man. Ed. 6, 429. 1890.

Tall, erect, sometimes 10° high, with flexuous branches; inflorescence spicate; utricle ovoid, tubercled, indehiscent. Vermont to Manitoba, Tennessee and Nebraska. This and the following varieties perhaps constitute a distinct species.

Acnida tamariscina concatenàta (Moq.) Uline & Bray, Bot. Gaz. 20: 158. 1895.
Acnida cannabina var. *concatenata* Moq. in DC. Prodr. 13. Part 2, 278. 1849.
Montelia tamariscina var. *concatenata* A. Gray, Man. Ed. 5, 413. 1867.

Stem often decumbent; flowers larger, in separated glomerules. Range of preceding variety.

Acnida tamariscina prostràta Uline & Bray, Bot. Gaz. 20: 158. 1895.

Stems diffuse and prostrate or sometimes ascending; leaves rarely over 1′ long, spatulate; flowers in axillary clusters or in separated glomerules. Michigan and South Dakota to Missouri.

3. CLÁDOTHRIX Nutt.; Moq. in DC. Prodr. 13: Part 2, 359. 1849.

Annual or perennial diffusely branched stellate-pubescent herbs, with opposite entire or slightly undulate petioled leaves, and very small perfect 3-bracted flowers, solitary or clustered in the axils. Calyx of 5 equal pilose erect dry oblong 1-nerved sepals. Stamens 5, hypogynous, their filaments united at the base, their anthers 1-celled. Ovary subglobose; style short; stigma capitate or 2-lobed. Utricle globose, indehiscent. [Greek, branch-hair, from the stellate pubescence.]

About 4 species, natives of southwestern North America and Mexico.

1. Cladothrix lanuginòsa Nutt. Cladothrix. (Fig. 1411.)

Achyranthes lanuginosa Nutt. Trans. Am. Phil. Soc. (II.) 5: 166. 1833–37.
Cladothrix lanuginosa Nutt.; Moq. in DC. Prodr. 13: Part 2, 360. 1849.

Perennial, somewhat woody at the base, or sometimes annual, stem terete, much branched, sometimes thickened at the nodes, the branches prostrate or ascending, 4′–12′ long. Leaves orbicular, broadly ovate or rhombic-ovate, obtuse or acute, usually narrowed at the base, entire, inconspicuously veined, rather firm, 2″–12″ wide, the petioles shorter than or equalling the blades; flowers ½″ broad or less, mostly clustered in the axils of small upper leaves toward the ends of the branches.

In dry soil, Kansas to Texas, Arizona and Mexico. June–Sept.

4. FROELÍCHIA Moench, Meth. 50. 1794.

Annual, erect woolly or silky, branching or simple herbs, with opposite sessile entire or slightly undulate narrow leaves, or the lower and basal ones contracted into petioles. Flowers perfect, 3-bracted, often bracteolate, in panicled dense spikes. Calyx tubular, nearly terete, 5-cleft or 5-toothed, very woolly, its tube longitudinally crested and sometimes tubercled in fruit. Stamens 5, their filaments united into a tube, which is 5-cleft at the summit and bears the 1-celled anthers between its lobes. Ovary ovoid; style slender or wanting; stigma capitate or penicillate. Utricle indehiscent, enclosed by the tube of united filaments. [Name in honor of J. A. Froelich, a German botanist.]

About 12 species, all American. Besides the following, 2 others occur in the Southwestern States.

Stout, 2°–4° tall; crests of fruiting calyx continuous, dentate. 1. *F. Floridana.*
Slender, 10′–20′ tall; crests of fruiting calyx interrupted. 2. *F. gracilis.*

1. Froelichia Floridàna (Nutt.) Moq. Florida Froelichia. (Fig. 1412.)

Oplotheca Floridana Nutt. Gen. 2: 79. 1818.
Froelichia Floridana Moq. in DC. Prodr. 13: Part 2, 420. 1849.

Stem stout, 2°–4° tall, the branches slender, erect-ascending, leafless above. Upper leaves linear or linear-oblong, sessile, acute or acuminate at both ends, 1′–3′ long, the lower spatulate or oblanceolate, obtuse or acute at the apex, 3′–6′ long, ½′–1′ wide, narrowed into margined petioles; spikes mostly opposite, narrowly ovoid or oblong, obtuse or subacute, ½′–1′ long; fruiting calyx with prominent longitudinal wing-like toothed crests.

In dry soil, Illinois and Minnesota to Nebraska and Colorado, south to Tennessee, Florida, Kansas and Texas. June–Sept.

2. Froelichia grácilis Moq. Slender Froelichia. (Fig. 1413.)

Froelichia gracilis Moq. in DC. Prodr. 13: Part 2, 420. 1849.

Similar to the preceding species but the stem slender, branched, especially from the base, or sometimes simple, 10′–20′ tall. Leaves all linear or linear-oblong, acute at both ends, 9″–2′ long, sessile or the lower commonly spatulate, obtusish and narrowed into very short petioles; spikes alternate or opposite, oblong, mostly obtuse, ¼′–1′ long; fruiting calyx with 5 longitudinal rows of processes or these confluent into interrupted crests.

In dry soil, western Nebraska and Colorado to Texas. Perhaps intergrades with the preceding species. June–Sept.

5. IRESÌNE P. Br. Civ. & Nat. Hist. Jam. 358. 1756.

Annual or perennial tall herbs, with opposite broad petioled thin leaves and very small polygamous perfect or dioecious 3-bracted white flowers, in large terminal panicles or panicled spikes. Calyx 5-parted, the pistillate usually woolly-pubescent. Stamens 5, rarely less; filaments united by their bases, filiform; anthers 1-celled. Utricle very small, subglobose, indehiscent. [Greek, in allusion to the woolly pubescence.]

About 20 species, natives of warm and temperate regions. Besides the following another occurs in the southwestern United States.

1. Iresine paniculàta (L.) Kuntze. Blood-leaf. Juba's Bush. (Fig. 1414.)

Celosia paniculata L. Sp. Pl. 206. 1753.

Iresine celosioides L. Sp. Pl. Ed. 2, 1456. 1763.

Iresine paniculata Kuntze, Rev. Gen. Pl. 542. 1891.

Annual, stem erect, usually branched, slender, 2°–5° tall, glabrous or nearly so. Leaves ovate, ovate-lanceolate or the upper lanceolate, 2′–6′ long, slender-petioled, pinnately veined, nearly or quite glabrous; flowers very numerous, 1″ broad or less, in large terminal much branched panicles; calyx and bracts silvery, dry; pistillate flowers white-villous at the base, about twice as long as the bracts.

In dry soil, Ohio to Kansas, south to Florida and Texas. Widely distributed in tropical America. Aug.–Sept.

Family 17. PHYTOLACCÀCEAE Lindl. Nat. Syst. Ed. 2, 213. 1836.

POKEWEED FAMILY.

Herbs (some tropical species shrubs or trees) with alternate entire mostly exstipulate leaves, and perfect regular polygamous or monoecious usually racemose flowers. Calyx 4–5-parted or of 4 or 5 distinct sepals, its segments or sepals imbricated in the bud. Petals wanting. Stamens as many as the calyx-segments or sepals and alternate with them, or more numerous, hypogynous; filaments subulate or filiform, distinct or united at the base; anthers 2-celled, the sacs longitudinally dehiscent, often nearly separated. Ovary superior, several-celled in most of the genera; ovules solitary in the cavities, amphitropous. Styles as many as the carpels, short or none; stigmas linear or filiform. Fruit a berry in the following genus, capsular or samaroid in some tropical genera. Endosperm of the seed mealy or fleshy.

About 22 genera and 85 species, mostly in the tropics.

1. PHYTOLÁCCA L. Sp. Pl. 41. 1753.

Tall perennial herbs (some tropical species woody), with ample petioled exstipulate leaves, and small flowers in terminal racemes, which by the further growth of the stem become opposite the leaves. Pedicels bracted at the base and often 1–3 bracted above. Calyx of 4 or 5 persistent rounded sepals. Stamens 5–15, inserted at the base of the calyx; anthers mostly oblong. Ovary subglobose, composed of 5–15 distinct or somewhat united carpels. Fruit a depressed-globose 5–15-celled fleshy berry. Seeds 1 in each cavity, erect, compressed; embryo annular in the mealy endosperm. [Name Greek and French, referring to the crimson juice of the berries.]

About 10 species, the following of eastern North America, the others of tropical distribution.

1. Phytolacca decándra L. Poke. Scoke. Pigeon-berry. Garget. (Fig. 1415.)

Phytolacca decandra L. Sp. Pl. Ed. 2, 631. 1762.

A glabrous strong-smelling succulent erect branching herb, 4°–12° tall, the root perennial, large, poisonous, the stem stout, its pith divided into disks separated by lens-shaped cavities. Leaves oblong-lanceolate or ovate-lanceolate, pinnately veined, acute or acuminate at both ends, 8′–12′ long; petioles ½′–4′ long; racemes peduncled, 2′–8′ long; pedicels divergent, 2″–6″ long, each with a subulate-lanceolate bractlet at its base and usually 2 similar ones above; flowers perfect; calyx white, 2″–3″ broad, its sepals suborbicular, or oval; stamens 10, slightly shorter than the sepals; ovary green, 10-celled; styles recurved; berry dark purple, 5″–6″ in diameter, 3″–4″ high, very juicy, its 10 carpels conspicuous when dry.

In various situations, Maine and Ontario to Minnesota, Florida and Texas. Sometimes a troublesome weed. Naturalized in Europe. The young shoots are eaten like asparagus. June–Sept. Berries ripe Aug.–Oct. Also called Inkberry.

Family 18. NYCTAGINÀCEAE Lindl. Nat. Syst. Ed. 2, 213. 1836.

FOUR-O'CLOCK FAMILY.

Herbs (some tropical genera trees or shrubs) with simple entire leaves, and regular flowers in terminal or axillary clusters, in the following genera subtended by involucres of distinct or united bracts. Petals none. Calyx inferior, usually corolla-like, its limb campanulate, tubular or salverform, 4–5-lobed or 4–5-toothed. Stamens hypogynous; filaments filiform; anthers 2-celled, dehiscent by lateral slits. Ovary enclosed by the tube of the perianth, sessile or stipitate, 1-celled, 1-ovuled; ovule campylotropous; style short or elongated; stigma capitate. Fruit a ribbed, grooved or winged anthocarp.

About 17 genera and 250 species, of wide geographic distribution, most abundant in America.

Involucre of united bracts; pairs of leaves equal. 1. *Allionia.*
Involucre of separate bracts; pairs of leaves mostly unequal. 2. *Abronia.*

1. ALLIÒNIA Loefl. Iter Hisp. 181. 1758.

[OXYBAPHUS L'Her.; Willd. Sp. Pl. 1: 185. 1797.]

Forking herbs, with opposite equal leaves, and involucres in loose terminal panicles. Involucre 5-lobed (of 5 partially united bracts) 3–5-flowered, becoming enlarged and reticulate-veined after flowering. Perianth campanulate, its tube constricted above the ovary, its limb corolla-like, deciduous. Stamens 3–5, generally 3, unequal, hypogynous. Fruit obovoid or clavate, strongly ribbed, pubescent in our species. [Name in honor of Chas. Allioni, 1725–1804, a botanist of Turin.]

About 20 species, natives of North and South America, one Asiatic.

Leaves broadly ovate, cordate or oblong-ovate, all petioled. 1. *A. nyctaginea.*
Leaves oblong or lanceolate, only the lower petioled.
  Plant glabrous or nearly so except the inflorescence. 2. *A. albida.*
  Plant densely pubescent all over. 3. *A. hirsuta.*
Leaves linear, sessile.
  Plant tall, 1°–2° high; branches erect-ascending. 4. *A. linearis.*
  Plants low, 4′–10′ high, diffusely branched; branches divergent.
    Involucres axillary, their lobes ovate-oblong, acute. 5. *A. Bodini.*
    Involucres clustered at the ends of branches, lobes semicircular, obtuse. 6. *A. Bushi.*

1. Allionia nyctagínea Michx. Heart-leaved Umbrella-wort. (Fig. 1416.)

Allionia nyctaginea Michx. Fl. Bor. Am. 1: 100. 1803.
Oxybaphus nyctagineus Sweet, Hort. Brit. 429. 1830.

Stem angled, often 4-sided below, rather slender, glabrous or but slightly pubescent, 1°–3° tall. Leaves broadly ovate, 2′–4′ long, 1′–3′ wide, acute at the apex, cordate, rounded or truncate at the base, all petioled except the small bract-like uppermost ones, glabrous or nearly so; peduncles and pedicels commonly somewhat pubescent; involucre shorter than the flowers; perianth red; stamens 3–5, exserted; style exserted; fruit oblong or narrowly obovoid, very pubescent.

In dry soil, Minnesota to the Northwest Territory, Illinois, Louisiana, Texas and New Mexico. May–Aug.

Allionia nyctaginea ovàta (Pursh) Morong, Mem. Torr. Club, 5: 146. 1894.
Allionia ovata Pursh, Fl. Am. Sept. 97. 1814.
Oxybaphus nyctagineus var. *oblongifolius* Torr. Bot. Mex. Bound. Surv. 174. 1859.

Leaves oblong, lanceolate, oblanceolate or obovate, not at all cordate at the base; inflorescence very pubescent. Nebraska to Texas and New Mexico.

2. Allionia álbida Walt. Pale Umbrella-wort. (Fig. 1417.)

Allionia albida Walt. Fl. Car. 84. 1788.
Oxybaphus albidus Choisy in DC. Prodr. 13: Part 2, 434. 1849.

Stem erect, furrowed or striate, 4-sided below, 1°–3° tall, glabrous or pubescent above, the peduncles and branches commonly more or less glandular and viscous. Leaves lanceolate or oblong-lanceolate, 3-veined from the base, glabrous, pubescent or ciliate, the upper sessile, the lower short-petioled; involucre much enlarged in fruit, pubescent, ciliate, becoming whitish and purple-veined; perianth pink or lilac; stamens and style often exserted; fruit with 5 or 6 obtuse hispid ribs, roughened in the furrows.

South Carolina to South Dakota and Colorado, south to Florida, Missouri and Texas. May–Aug.

3. Allionia hirsùta Pursh. Hairy Umbrella-wort. (Fig. 1418.)

Allionia hirsuta Pursh, Fl. Am. Sept. 728. 1814.
Oxybaphus hirsutus Choisy in DC. Prodr. 13: Part 2, 433. 1849.

Stem slender, 1°–3° tall, erect, angled and striate, glandular-pubescent, especially at the nodes, occasionally glabrate toward the base. Leaves lanceolate or linear-lanceolate, obtuse at the apex, sessile or the lowest sometimes short-petioled, pubescent, 1′–3′ long; branches and petioles very pubescent; inflorescence usually contracted; stamens often 5; fruit narrowly obovoid, the ribs obtuse, sometimes with low intermediate ribs in the furrows.

In dry soil, Minnesota to the Northwest Territory, south to Wisconsin, Colorado and Texas. July–Aug.

4. Allionia lineàris Pursh. Narrow-leaved Umbrella-wort. (Fig. 1419.)

Allionia linearis Pursh, Fl. Am. Sept. 728. 1814.
Calymenia angustifolia Nutt. Fraser's Cat. Name only. 1813.
Oxybaphus angustifolius Sweet, Hort. Brit. 429. 1830.

Stem slender, terete or somewhat 4-angled below, glabrous, glaucous, 1°–4¼° tall, erect, the branches and peduncles sometimes puberulent. Leaves linear, thick, 1-nerved, 1′–2½′ long, 1½″–4″ wide, obtuse or acute at the apex, sessile or the lower occasionally short-petioled; involucre about 3-flowered, green before flowering; perianth purple, longer than the involucre; stamens and style exserted; fruit commonly ronghened in the furrows between the 5 prominent ribs.

In dry soil, Minnesota to Utah, south to Texas and Mexico. June–Aug.

5. Allionia Bòdini (Holzinger) Morong. Bodin's Umbrella-wort. (Fig. 1420.)

Oxybaphus Bodini Holzinger, Contr. Nat. Herb. 1: 287. *pl. 21.* 1893.
Allionia Bodini Morong, Mem. Torr. Club, 5: 355. 1894.

Low, glabrous or minutely pubescent, stem whitish, diffusely branched, slender, 2′–5′ high, the branches divergent. Leaves narrowly linear, sessile, ½′–1¼′ long, 1″ wide or less, slightly narrowed at both ends, fleshy; involucres solitary and short-peduncled in the upper axils, finely pubescent, about 3″ broad when mature, 5-lobed to about the middle, the lobes ovate-oblong, acute; fruit narrowly obovoid, obtusely 5-ribbed, very pubescent, 2½″ high.

In dry soil, eastern Colorado and western Kansas. June–July.

6. Allionia Búshi Britton. Bush's Umbrella-wort. (Fig. 1421.)

Allionia Bushi Britton, Bull. Torr. Club, 22: 223. 1895.

Low, glabrous, somewhat fleshy, stem nearly white, diffusely branched, about 8′ high, the branches sleuder, widely divergent. Leaves narrowly linear, sessile, 1′–3′ long, 1″–1½″ wide, blunt, their width almost uniform from base to apex; iuvolucres clustered at the ends of the branches, at first campanulate and longer than the flowers, at length rotate and becoming 10″ broad, membranous, pubescent, finely reticulate-veined, their short lobes semicircular, rounded, the midveins prominent.

In dry ground; Jackson Co., Missouri. Aug.

2. ABRÒNIA Juss. Gen. 448. 1774.

Annual or perennial herbs, with opposite petioled thick entire leaves, one of each pair somewhat larger than the other. Stems ascending, erect or prostrate, branching, mostly glandular-pubescent, with clustered or solitary numerous-flowered involucres ou long axillary peduncles. Flowers sessile, usually conspicuous. Perianth-tube elongated, tubular or funnelform, the limb spreading, 5-lobed, the lobes obcordate or emarginate. Stamens 3–5, nu-

equal, inserted on the tube of the perianth; anthers linear-oblong, included. Style filiform. Fruit dry, 1–5-winged, the wings broad or narrow, reticulate-veined. Seed cylindric, smooth, shining. [Name from the Greek, graceful.]

About 15 species, all American. Besides the following, some 10 others occur in western North America.

Perennial; flowers white; wings of the fruit 1″ broad or less. 1. *A. fragrans.*
Annual; flowers pink; wings thin, 4″–7″ broad, very conspicuous. 2. *A. micrantha.*

1. Abronia fràgrans Nutt. White Abronia. (Fig. 1422.)

Abronia fragrans Nutt.; Hook. Kew Journ. Bot. 5: 261. 1853.

Perennial, viscid-pubescent, stem erect or ascending, usually much branched, 1°–2° high. Leaves oval, ovate or oblong-elliptic, petioled, obtuse at the apex, cuneate, truncate or rounded at the base, 1′–2½′ long; bracts of the involucre 5 or 6, large, ovate or obovate, white; flowers white, very numerous in the involucres, 5″–10″ long, fragrant, opening at night; fruit 4″–5″ high, coriaceous with 5 or sometimes fewer, undulate coarsely reticulated wings about 1″ wide, which do not close over its summit.

In dry soil, Iowa to Nebraska and Montana, south to Texas and Mexico. June–Aug.

2. Abronia micrántha. (Torr.) Chois. Pink Abronia. (Fig. 1423.)

Tripteridium micranthum Torr. Frem. Rep. 96. 1845.
Abronia micrantha Chois. in DC. Prodr. 13: Part 2, 436. 1849.
Abronia Cycloptera A. Gray, Am. Journ. Sci. (II.) 15: 319. 1853.

Annual, glabrous below, more or less glandular-pubescent above, stem ascending, branched, 1°–2° high. Leaves similar to those of the preceding species in size and outline; involucral bracts ovate or ovate-lanceolate, acute or acuminate; flowers several or numerous, about 9″ long, bright pink; calyx-limb 4″–8″ broad; fruit nearly 1′ high, its 2–4 membranous wings 4″–7″ broad, entire-margined, shining, very conspicuous, glabrous, united over the body of the fruit, beautifully reticulate-veined.

In dry soil, western Nebraska to Wyoming and Nevada, south to Texas and New Mexico. June–Aug.

Family 19. **AIZOÀCEAE** A. Br.; Aschers. Fl. Brand. 60. 1864.

CARPET-WEED FAMILY.

Herbs, rarely somewhat woody, mostly prostrate and branching, with (in our species) opposite or verticillate leaves and solitary cymose or glomerate perfect, small regular flowers. Stipules none or scarious, or the petiole-bases dilated. Calyx 4–5-cleft or 4–5-parted. Petals small or none in our species. Stamens perigynous, equal in number to the sepals, fewer, or more numerous. Ovary usually free from the calyx, 3–5-celled, and ovules numerous in each cell in our species. Fruit a capsule with loculicidal or circumscissile dehiscence. Seeds amphitropous; seed-coat crustaceous or membranous; endosperm scanty or copious; embryo slender, curved.

22 genera and about 500 species, mostly of warm regions, a few in the temperate zones.

Fleshy, sea-coast herbs; leaves opposite; capsule circumscissile. 1. *Sesuvium.*
Not fleshy; leaves verticillate; capsule 3-valved. 2. *Mollugo.*

1. SESÙVIUM L. Syst. Ed. 10, 1058. 1759.

Fleshy decumbent or prostrate herbs, with opposite leaves and solitary or clustered axillary pink or purplish flowers. Stipules none, but the petioles often dilated and connate at the base. Calyx-tube top-shaped, 5-lobed, the lobes oblong, obtuse. Petals none. Stamens 5 60, inserted on the tube of the calyx. Filaments filiform, sometimes united at the base. Ovary 3–5-celled. Styles 3–5, papillose along the inner side. Capsule membranous, oblong, 3–5-celled, circumscissile. Seeds round-reniform, smooth; embryo annular.

About 4 species, natives of sea-coasts and saline regions. Besides the following, another occurs in the Southern States and in the alkaline areas of the Far West.

1. Sesuvium marítimum (Walt.) B.S.P. Sea Purslane. (Fig. 1424.)

Pharnaceum maritimum Walt. Fl. Car. 117. 1788.

Sesuvium pentandrum Ell. Bot. S. C. & Ga. 1: 556. 1821.

Sesuvium maritimum B.S.P. Prel. Cat. N. Y. 20. 1888.

Annual, glabrous, decumbent or ascending, rarely erect, branches 2′–12′ long. Leaves obovate or spatulate, entire, rounded or slightly emarginate at the apex, narrowed into a petiole or the upper ones sessile, 4″–12″ long; flowers sessile or very nearly so, about 1″ broad, mostly solitary in the axils; stamens 5, alternate with the calyx-lobes; capsule ovoid, about 2″ high, scarcely longer than the calyx.

Sands of the seashore, eastern Long Island, N. Y., to Florida. July–Sept.

2. MOLLÙGO L. Sp. Pl. 89. 1753.

Herbs, mostly annual, much branched, with verticillate, or in some species basal or alternate leaves, and small cymose or axillary whitish flowers. Stipules scarious, membranous, deciduous. Calyx 5-parted. Sepals persistent, scarious-margined. Petals none. Stamens 3–5, when 3 alternate with the cells of the ovary, when 5 alternate with the sepals. Ovary ovoid or globose, usually 3-celled. Capsule usually 3-celled, 3-valved, loculicidally dehiscent. Seeds small, the testa smooth, granular or sculptured.

About 12 species, most of them of tropical distribution. Besides the following, another occurs in the Southwestern States.

1. Mollugo verticillàta L. Carpetweed. (Fig. 1425.)

Mollugo verticillata L. Sp. Pl. 89. 1753.

Prostrate, glabrous, not fleshy, much branched, spreading on the ground and forming patches sometimes 20′ in diameter. Leaves verticillate, in 5's or 6's, spatulate, obovate or linear, entire, obtuse, 6″–12″ long, narrowed into a petiole; flowers axillary, less than 1″ broad; pedicels filiform; sepals oblong, slightly shorter than the ovoid capsule, which appears roughened by the projecting seeds; seeds reniform, usually smooth and shining.

In waste places and cultivated grounds, New Brunswick and Ontario to Minnesota, south to Florida, Texas and Mexico. Native of the warmer parts of America, now widely distributed as a weed. Also called Indian Chickweed. May–Sept.

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